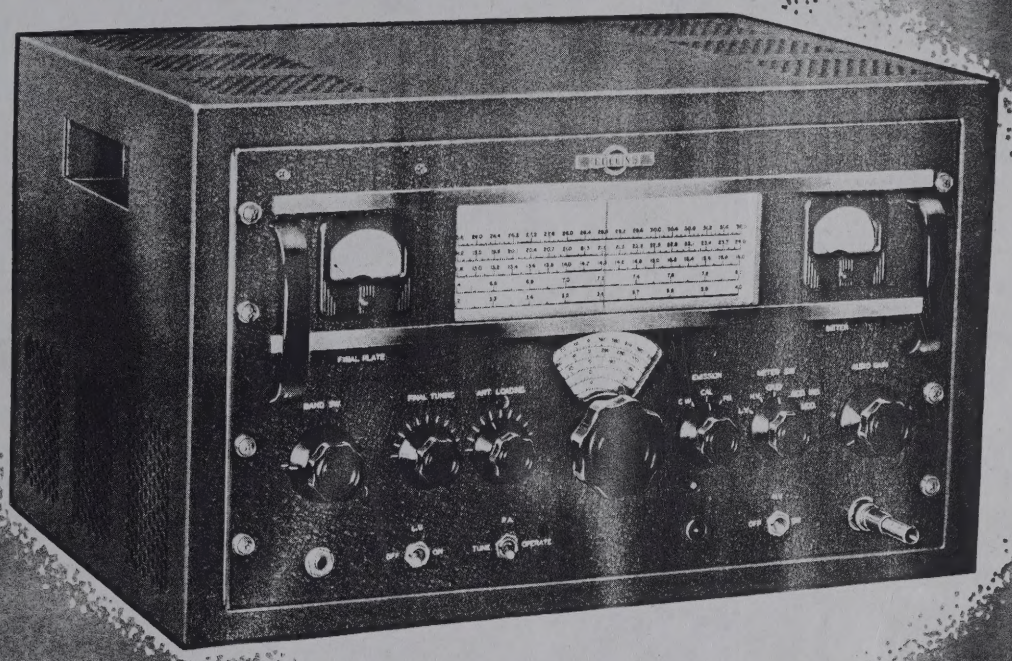
INSTRUCTION BOOK



32V-3

AMATEUR TRANSMITTER

COLLINS

INSTRUCTION BOOK

for

32V-3

AMATEUR TRANSMITTER

Manufactured By

COLLINS RADIO COMPANY

Cedar Rapids, Iowa

520 9570 00

1 January 1952

COLLINS

GUARANTEE

The Collins Amateur equipment described herein is sold under the following guarantee:

Collins agrees to repair or replace, without charge, any equipment, parts, or accessories which are defective as to design, workmanship or material, and which are returned to Collins at its factory in Cedar Rapids, Iowa, transportation prepaid provided buyer has completed and returned to Collins promptly following his purchase the Registration Card included in the Instruction Book furnished with the equipment and provided Buyer has given to Collins written notice of the claimed defect in equipment or accessories within ninety (90) days from date of purchase.

The foregoing guarantee shall not be applicable to:

(a) equipment, accessories, tubes, and batteries not manufactured by Collins or from Collins' designs, all of which are subject only to such adjustment as Collins may obtain from supplier thereof;

(b) equipment or accessories which shall fail to operate in a normal or proper manner due to exposure to excessive moisture in the atmosphere or otherwise after delivery, any such failure not being deemed a defect within the meaning of the foregoing provisions;

(c) any failure due to use of equipment in excess of that contemplated in normal amateur operations, any such failure not being deemed a defect within the meaning of these provisions.

The guarantee of these paragraphs is void if equipment is altered or repaired by others than Collins or its authorized service centers.

Notice of any claimed defect must be given to Collins prior to return of any item. Such notice must give full information as to nature of defect and identification (including part number if possible) of part considered defective. Upon receipt of such notice, Collins will promptly advise respecting return of equipment. Failure to secure our advice prior to the forwarding of goods for return may cause unnecessary delay in the handling of such merchandise.

No other warranties, expressed or implied, shall be applicable to said equipment, and the foregoing shall constitute the Buyer's sole right and remedy under the agreements in this paragraph contained. In no event shall Collins have any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of the products, or any liability to use them either separately or in combination with other equipment or materials, or from any cause.

IMPORTANT! It is necessary that the attached business reply card be filled out and mailed to the Company promptly in order for this guarantee to be effective.

COLLINS RADIO COMPANY

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PURCHASER MUST fill out this card and mail to Collins in order to assure full coverage under the guarantee

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

First Class Permit No. 236 (Sec. 34.9 P. L. & R.) Cedar Rapids, Iowa

COLLINS RADIO COMPANY

CEDAR RAPIDS,

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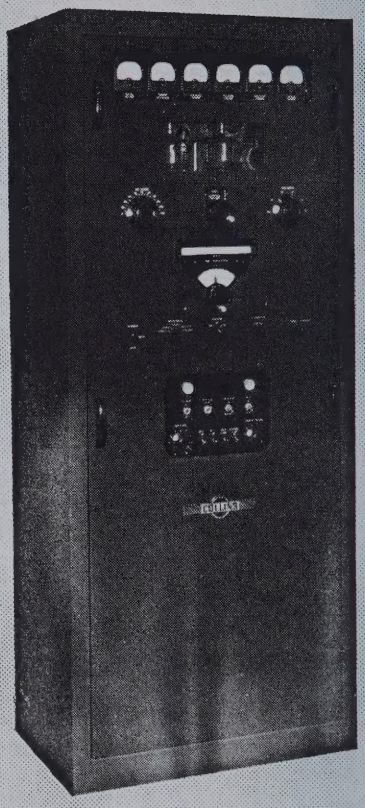
SALES DEPT.

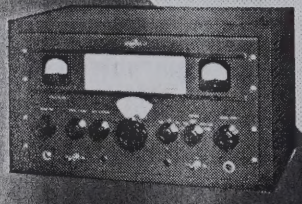
EQUIPMENT OF HIGHER QUALITY FOR DISCRIMINATING AMATEURS

...ble Con-
...teur Band

The KW-1 1000 Watt Bandswitching Transmitter



The 32V 150 Watt Bandswitching Transmitter. Permeability Tuned Oscillator Control.



REGISTRATION CARD

Gentlemen: Date_____

I have purchased the following unit of Collins Amateur Radio Equipment:

Model No._____

Date Purchased_____ Serial No._____

Purchased From:

Dealer's Name:_____

Dealer's Address:_____

I am familiar with the Collins Guarantee of Amateur equipment as printed in the instruction book and request that you register ownership of the above described equipment in my name.

Owner's Name_____ Call_____

Address _____

Please send data on the following equipment:_____

BE SURE TO FILL IN THIS CARD COMPLETELY. THANK YOU.

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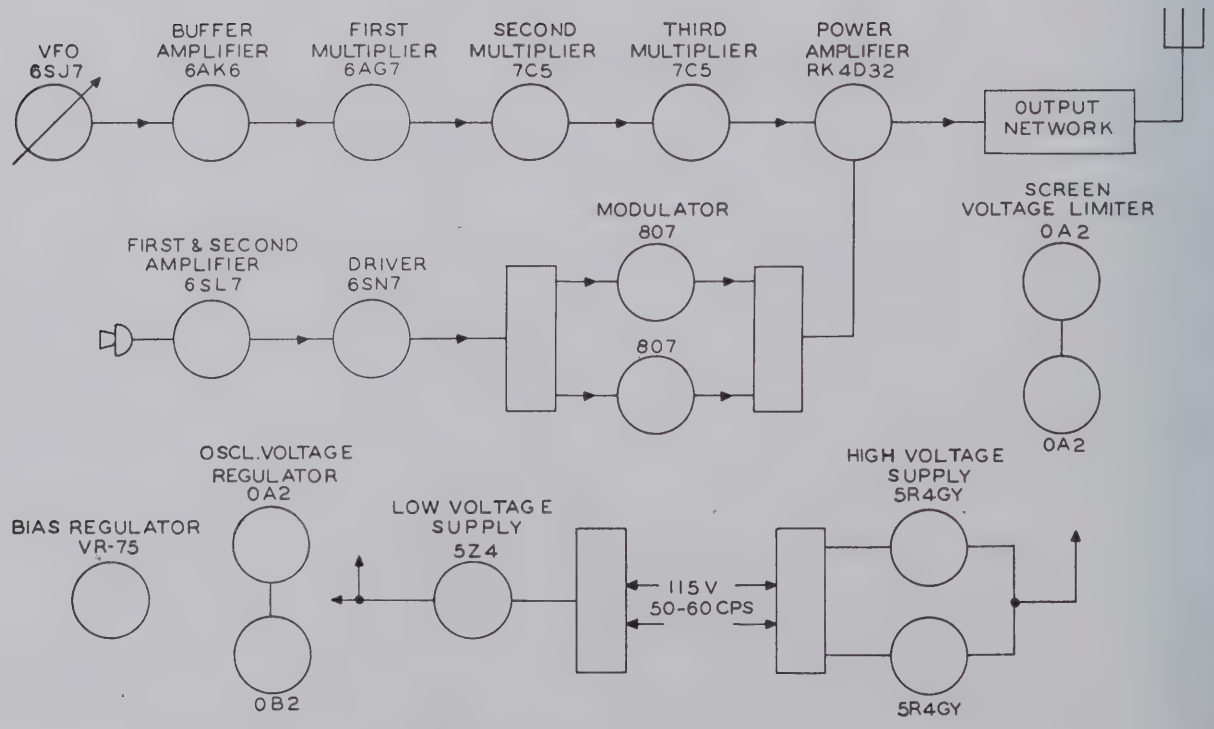


Figure 1-1 Model 32V Amateur Transmitter

SECTION 1

GENERAL DESCRIPTION

1.1. GENERAL.

1.1.1. This instruction book describes the installation, operation, and maintenance of the Collins 32V-3 amateur transmitter.

The type 32V-3 transmitter is a small, compact, VFO controlled unit featuring complete bandswitching and is capable of CW and phone operation on all amateur bands between 3.5 and 29.7 megacycles. Final plate power input of 120 watts phone and up to 150 watts CW is possible. Extra shielding and filtering is employed to minimize possibility of interference to other services. In fringe areas where television signals are very weak, certain installations may experience interference. In this event a low-pass filter such as the Collins Model 35C-2 should be installed in the antenna lead at the transmitter. Installation of a high-pass filter in the television receiver antenna lead may prove helpful.

The 32V-3 transmitter is designed for table mounting. The complete transmitter is housed in a single cabinet 21-1/8" wide, 12-1/4" high and 13-13/16" deep and weighs approximately 110 lbs. Openings are provided to assure adequate ventilation for all heat producing elements.

Transmitter components are divided into the five units named below:

70E-8A Oscillator
R-F Unit
Output Network
Speech Amplifier and Modulator
Power Supply

All wiring is independent of the cabinet, and the complete unit may be removed from the cabinet for inspection or maintenance.

Complete coverage of the 80, 40, 20, 15, 11 and 10 meter bands is obtained with the 32V-3. Quick band-change on all stages is accomplished by bandswitching. Tuning controls of the permeability tuned circuits of the 1st, 2nd and 3rd multipliers are ganged with the oscillator. The final tank consists of impedance matching network with two separate controls located on the front panel, one for tuning and one for loading.

Two heavy duty toggle switches control the low voltage and high voltage circuits. The switches are so arranged that the high voltage cannot be applied until the low voltage circuits have been energized.

For convenience in applying high voltage, a push-to-talk switch associated with the microphone may be used instead of the HV toggle switch.

A meter selector switch on the front panel enables the operator to meter all important circuits of the transmitter. This switch can be rotated to five different positions. Each position inserts a meter into the selected circuit to be metered. A separate meter reads FINAL AMPLIFIER plate current only. The CW-CAL-PH switch is used to select the type of emission desired and to calibrate the accuracy of the dial reading against a known standard frequency. In the CW position, the modulator is disabled and the master oscillator operates continuously with the HV switch on. In the "CAL" position a signal of strength suitable for zero-beating with incoming signals may be heard in the associated receiver without operation of the final amplifier. On phone position, the key is closed and the modulator is operative. Keying is accomplished by means of grid block keying of the buffer stages. This keying is done on the buffer and first and second multiplier stages.

1.2. REFERENCE DATA.

Power Source: 115 volts ac 50/60 cps single phase.

Power Input Requirements: The maximum overall input power requirement is 500 watts at 90% power factor.

PA Plate Power Input: The nominal rated power input of the 32V-3 is 120 watts on phone and 150 watts CW.

Audio Distortion: Audio distortion is less than 10% at 90% modulation with a 1000 cps input frequency.

Frequency Response: Within 2 db from 200-3000 cps.

1.3. TUBE COMPLEMENT.

Quantity	Tube Type	Function
1	6SJ7	Oscillator
1	6AK6	Buffer Amplifier
1	6AG7	First Multiplier
1	7C5	Second Multiplier
1	7C5	Third Multiplier
1	4D32	RF Power Amplifier
1	6SL7	Audio Amplifier
1	6SN7	Audio Driver
2	807	Modulators
1	5Z4	LV Rectifier
2	5R4GY	HV Rectifier
1	VR-75	Bias Regulator
2	0A2	Screen Voltage Limiters

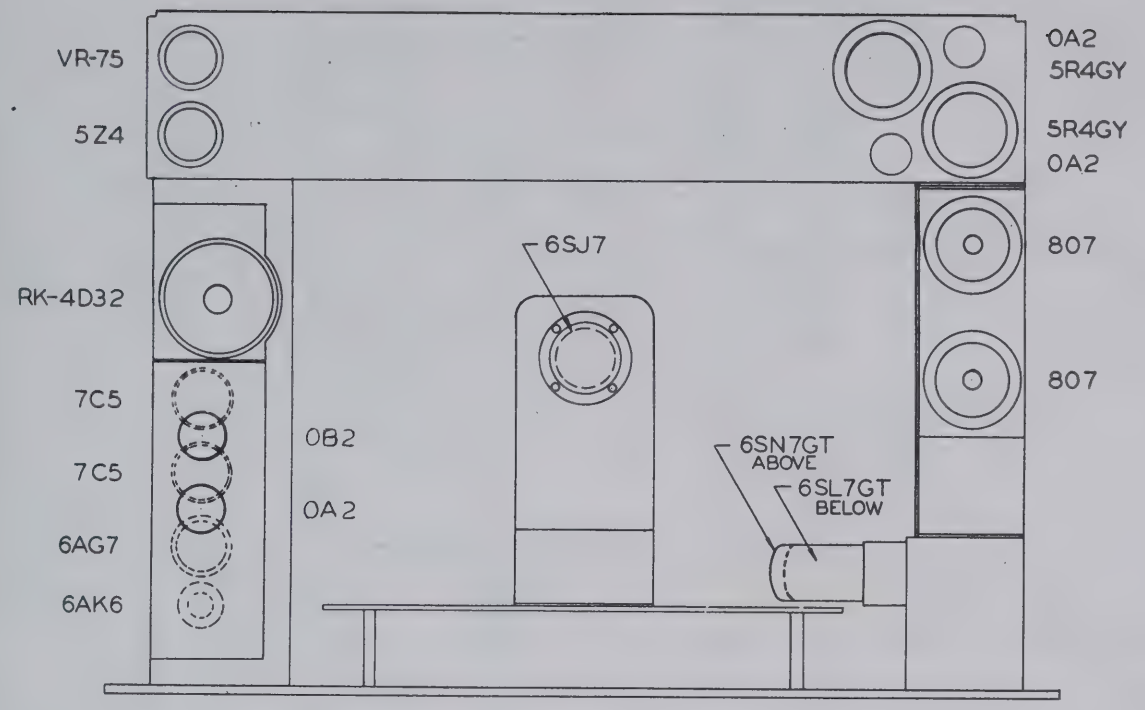


Figure 2-1 Tube Placement Diagram

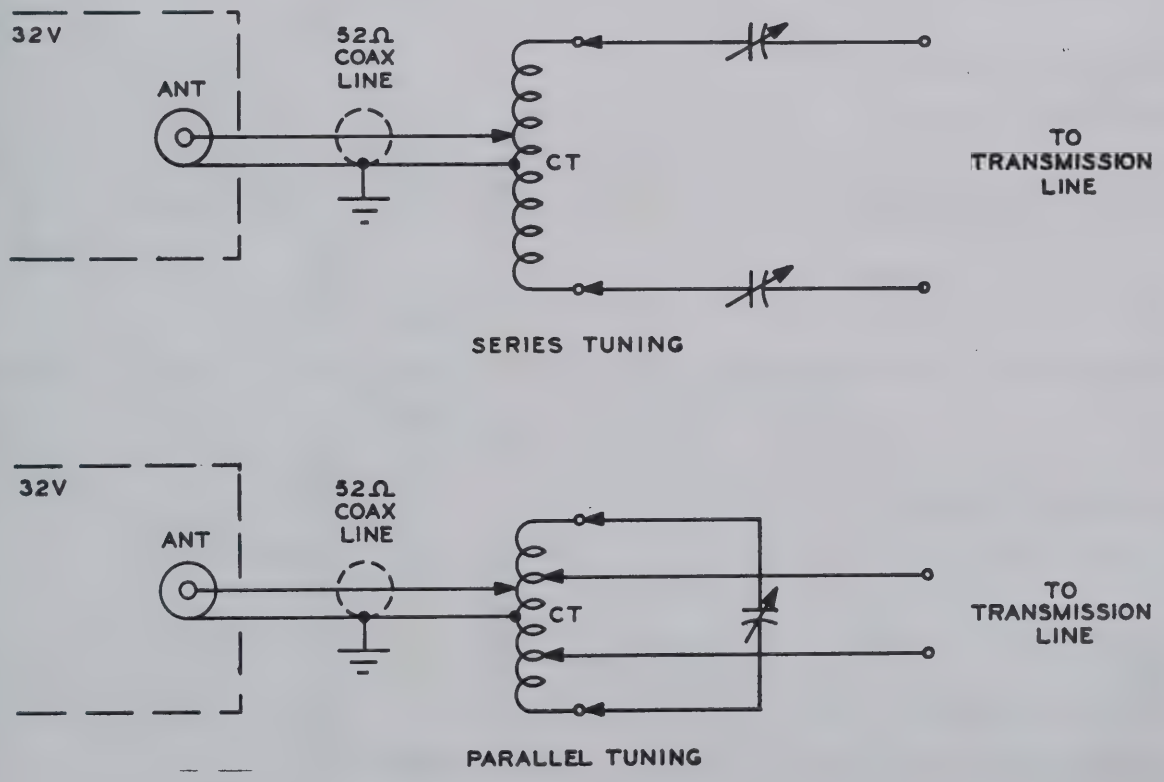


Figure 2-2 Typical Antenna Tuner

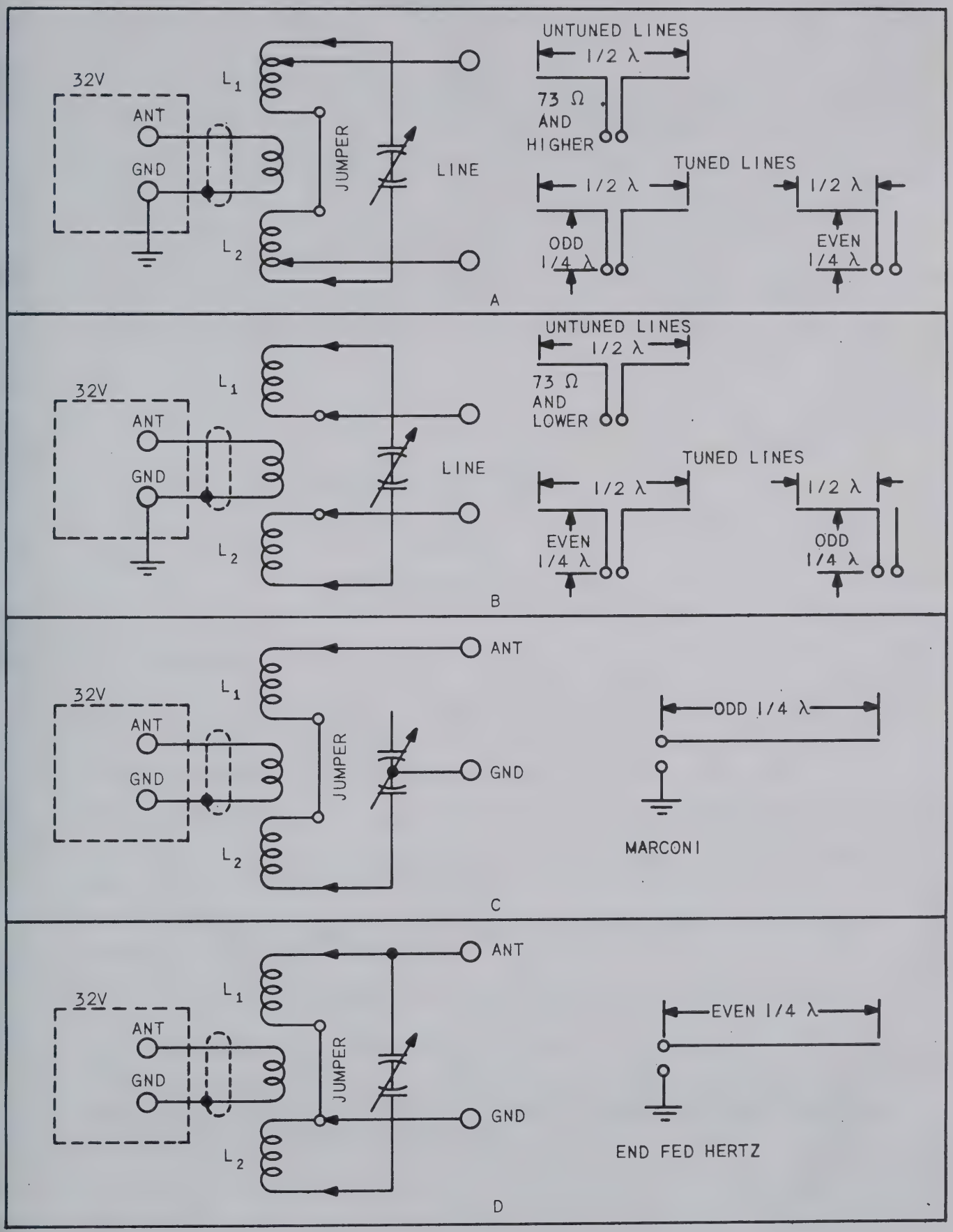


Figure 2-3 Typical Antenna Tuner Circuits

The coaxial line should then be connected through a series variable capacitor to the antenna tuner link of one turn on 10, 15 and 20 meters, two turns on 40 meters and three on 80 meters. The antenna tuner is resonated with the transmitter and the link reactance tuned out with the coaxial line series capacitor. The feeders should then be moved in equal increments out from the center, with the tuned circuit resonated, until the same loading condition exists that was noted with the dummy load. This will set up the desired condition where the transformation of impedance from the coaxial line is from 52 or 72 ohms to the antenna impedance. If this is done no standing waves will exist on the coaxial line and the loading capacitors will not be operated at excessively high values of current.

ADJUSTMENT AND OPERATION

SECTION 3

ADJUSTMENT AND OPERATION

3.1. ADJUSTMENT.

3.1.1. 600 v - 700 v SWITCH. - This switch, located in the primary of the power transformer, has been placed at the rear of the transmitter to select output voltages of either 600 or 700 volts. It is recommended that this switch be placed in the 600 volt position for initial adjustments.

3.1.2. CALIBRATION. - To check dial calibration, proceed as follows:

a. Turn the equipment ON as outlined in steps a. and b. paragraph 3.2.3.

b. Tune a communications receiver to WWV at 10 mc. The BFO in the receiver should be OFF.

c. Rotate the BAND switch to 80 meter band. (lowest scale)

d. Rotate the TUNING dial to 4.0 mc.

e. Rotate the CW-CAL-PH control to CAL. This turns the VFO, buffer, first and second multiplier stages ON so that a calibration signal can be heard. Close the telegraph key.

f. Continue to rotate the TUNING dial about 4.0 mc until the calibration signal is zero beat with WWV.

g. Turn the FIDUCIAL screw until the hair line is on 4.0 mc.

h. In like manner, the dial can be calibrated on 15,000 kc by setting the communications receiver at WWV on 15 mc and the 32V-3 TUNING dial at 15 mc on the 20M BAND position. See the following table.

WWV Frequency	Dial Setting	Oscillator Frequency	Oscillator Harmonic
10 mc	4,000	2,000	5th
15 mc	15,000	1,875	8th
15 mc	7,500	1.875	8th

3.2. OPERATION.

3.2.1. GENERAL. - Operation of this equipment is exceedingly simple once the functions of the controls are understood. The function of the controls is hereby given, followed by a step-by-step procedure for operation of the equipment.

3.2.2. FUNCTION OF CONTROLS.

a. BAND SWITCH. - This control selects the proper tuning elements for all stages of the amateur band upon which operation is desired. The knob rotates 180 degrees between adjacent bands. Clockwise rotation selects higher frequency bands. The band selected is indicated by the band lighted slide rule dial.

b. TUNING Control. - This control operates both the slide rule dial and the vernier dial to select the exact frequency upon which operation is desired.

c. CW-CAL-PH S itch. - This three-position switch selects the type of emission required. In the CW position, the secondary of the modulation transformer is short circuited, the screen voltage is removed from the modulator tubes, a bleeder is placed between the PA screen grid to ground and the carrier-control relay is connected so that it can be operated by the HV switch. The transmitter is ready for CW operation when the key is inserted in the KEY jack. In the CAL position, the VFO, buffer, and three multiplier stages are in operation to supply a signal of suitable strength for zero-beating against received signals without causing interference to other stations. The carrier control relay is disconnected from the HV switch so that the associated receiver and antenna changeover relay will be in the "Receive" condition. In the PH position, the switch opens the short circuit on the secondary of the modulation transformer, closes the keying circuit, applies screen voltage to the modulator tubes and connects the carrier control relay so that it can be operated by the HV switch or a push-to-talk switch on a microphone.

SECTION 2

INSTALLATION

2.1. UNPACKING.

After removing the unit from the packing box, inspect the unit for loose screws or bolts. Be certain all controls, such as switches, dials, etc. work properly. In case of damage, file all claims promptly with the transportation company. If a claim for damage is to be filed, the orginal packing case and material must be preserved. To assure the clearing away of all packing or blocking materials, remove the transmitter from its cabinet. When removing the transmitter, support the rear of the chassis to prevent breaking the interlock switch on the right rear edge. Check all tubes to see that they are fully in their sockets. See figure 2-1 for tube placement.

2.2. PLACING TRANSMITTER.

The console type cabinet is designed to be placed on the operating table along with the receiving equipment. Allow enough space at the rear for making the necessary external connections and for replacement of fuses. Provide sufficient clearance at the sides for full circulation of air.

2.3. EXTERNAL CONNECTIONS.

Place the two power switches in the off position before attempting to make any external connections. These connections are as follows:

(1) AC Power Line
(2) Microphone and Key
(3) Radiation System
(4) Remote Relay
(5) Receiver Disabling Circuit
(6) Remote Push-To-Talk

2.3.1. POWER LINE. - The 32V-3 operates from a 115 volt, single phase, 50/60 cycle power source. The maximum power required from the line is 500 watts. Check the power line to see that it meets these specifications. Insert the 115 volt plug into a convenient standard outlet.

2.3.2. MICROPHONE AND KEY. - The microphone plug is inserted in the microphone jack, J201, on the front of the transmitter. Make sure the clamping ring on the microphone plug is tightly turned on the thread around the input receptacle. Push-to-talk control connections are made to pin number 2 to ground in the microphone plug if the microphone being used is equipped with a push-to-talk switch. When using a microphone that does not have such a switch, the transmitter can still be controlled from a remote position by running a pair of leads from terminal 11 and 12 on the rear terminal strip (E308) to a switch box located at some point convenient to the operator.

CAUTION

Do not get the microphone and push-to-talk connections reversed when assembling the microphone plug as the relay voltage present could damage certain types of microphones.

2.3.3. RECEIVER DISABLING CIRCUIT. - Terminals 24 and 25 on a rear terminal strip are connected to normally closed contacts on the carrier control relay and are to be used for connections to the receiver disabling circuit. Remove the jumper on the receiver terminals and connect to these two terminals. The receiver can then be made inoperative when the push-to-talk switch is pressed, or whenever the HV switch is operated.

2.3.4. REMOTE RELAY CONNECTIONS. - Terminals 8, 9, 22 and 23 at the rear of the terminal strip may be used for operating an antenna change-over relay, or (when the 32V-3 is used as an exciter) they may be used as a relay for turning on the plate power of a power amplifier stage. If a 115 volt a-c type relay is used, connect the leads from the relay coil to terminals 22 and 23. In this manner, the relay coil will be energized thru contacts 8 and 9 of relay K301 whenever the push-to-talk switch or HV switch is operated. If a d-c type of relay is used, remove the jumper from terminals 8 and 9 and use terminals 9 and 23 to control the operation of the remote relay through the contacts of the transmitter relay.

CAUTION. - Do not use the RECEIVER DISABLING CIRCUIT AND REMOTE RELAY CONNECTIONS for conducting large currents, as damage to the relay contacts may result.

CAUTION. - For safety reasons, remove the 115 volt plug from the a-c power outlet while making connections to the rear terminal strip.

Switch pin S101H, located at the rear of the bandswitch, can be used to automatically operate antenna selector relays, etc., as the band switch is turned. Connections to this switch section must enter the cabinet through the ventilation holes in the side of the cabinet. Sacrifice of the TVI reduction features may result if proper filtering is not applied.

2.3.5. RADIATION SYSTEM. - The output network will match resistive loads of 26 to 200 ohms on all bands. It will tune out inductive or capacitive reactances normally encountered. The output network is unbalanced with respect to ground and may be used to feed directly into unbalanced systems. Connection to the antenna transmission line is made by means of a UG-21B/U (Amphenol 82-61) 50 ohm coaxial connector. Do not end feed antennas which are multiples of 1/2 wave in length directly from the antenna terminals; rather, use an external antenna tuner. Refer to "The ARRL Antenna Handbook" or any other good antenna handbook for antenna constructional information.

2.3.6. EXTERNAL ANTENNA TUNER. (Not Available). To feed balanced transmission lines, tuned or untuned, couple the transmitter to the transmission

line through a simple, tuned circuit. This arrangement will match a wide range of impedances. It will also add further attenuation to harmonics causing TVI, providing it is completely shielded. Figure 2-3 illustrates an antenna tuner that will function satisfactorily in this application. The impedance of the transmission line is matched by proper choice of taps on the inductances L1 and L2. The coupling link is coupled as tightly as possible and all loading adjustments are made by means of the LOADING control on the 32V-3. On the 15, 11, and 10 meter bands, the number of turns in the coupling coil should not exceed one turn; two turns may be necessary on the 20 meter band.

a. UNTUNED HIGH IMPEDANCE TRANSMISSION LINE. - If the line has a characteristic impedance of 73 ohms or more, employ parallel tuning of the antenna coils L1 and L2. For parallel tuning, close the jumper between the antenna coils. Transmission line taps varied toward the center of the coils until proper loading is obtained. The transmission line taps are those at the top of the coils; the capacitor taps are those nearer the bottom. In this type of operation, low values of capacitance and high values of inductance for the operating frequency generally are best. See illustration A., figure 2-3.

b. UNTUNED LOW IMPEDANCE TRANSMISSION LINES. - Transmission lines having a characteristic impedance of less than 50 ohms require series tuning of the antenna coils. This is done by opening the jumper between the coils and moving the transmission line tap arms to the inside coil turns. The capacitor taps at the outside turns and varies toward the inside turns until proper loading is obtained. Higher values of tuning capacity usually work out best in this type of operation. See illustration B., figure 2-3.

c. VOLTAGE FED TUNED LINES. - Transmission lines that have high voltage points at the transmitter should be connected and tuned according to specified instructions in paragraph a. above. These lines should also be cut to exact multiples of a quarter wave in length.

d. CURRENT FED TUNED LINES. - Transmission lines having high current at the transmitter end should be connected and tuned according to instructions given in paragraph b. above. These lines should also be cut to exact multiplies of a quarter wave in length.

e. QUARTER WAVE MARCONI. - Series tuning is indicated for quarter-wave Marconi antennas. In this type of operation, connect the antenna tuning circuit so that the two sections of the antenna coil and one-half of the antenna tuning capacitor are in series. To do this, place a grounding jumper to the rotor of the antenna tuning capacitor, connect the antenna to one end of the antenna coil, connect one stator of the tuning capacitor to the other end of the antenna coil and disconnect the other stator completely. (Place a piece of insulation material between the tap rotor and the coil turns.) See illustration C., figure 2-3. In event r-f

voltage appears on the cabinet, it can be minimized by extending the ground wire to 1/2 wave length and series tuning it until resonance is obtained.

f. END FED HALF WAVE. - This tuner can be used to tune this type of antenna also. Employ parallel tuning for this type of operation. Connect the antenna to one end of the antenna coil, make a ground connection to the inside turn of one of the antenna coils and close the jumper between the coils. The tuning capacitor taps should be equally spaced from each end of the antenna coils for proper tuning at the operating frequency. See illustration D., figure 2-3.

2.3.7. ANTENNA TUNER ADJUSTMENT. - After recognizing the high order of filtering that it was necessary to incorporate in an amateur transmitter operating in close proximity to television receivers, Collins engineers designed an output network to be used in the 32V-3 which should offer a great deal of attenuation to high order harmonics. In order to do this, it was necessary that an additional "L" section filter be added to the existing pi section. This new section contributes a great deal of filter action, but also offers some disadvantages. The first apparent difficutly noted is the apparent sharpness of tuning on the high frequency bands, particularly 28 mc. It must be recognized that this is inherent in any tuned filter where a high degree of selectivity is needed, and the fact that it does tune so sharply indicates that it is operating properly.

The pi section network was designed so that when used with the L section, a suitable range of impedances could be satisfactorily matched. The extreme cases were tabulated and the resulting voltages and currents were calculated. These voltages and currents were of such a magnitude as to not exceed the ratings of the components. However, when the customer connects the 32V-3 to an antenna system, frequently the standing waves are of such a nature as to reflect sufficient reactance so that the assigned endpoints of impedances are exceeded. This may result in an excess current thru the loading capacitors and subsequent failure.

However, when adequate precautions are taken, this problem can be greatly reduced. These precautions may be described simply by stating that they are directed in such a manner as to insure a flat 52 or 72 ohm line from the 32V-3 to the antenna tuner. The tuning procedure is as follows.

Disconnect the coaxial line from the antenna tuner link and terminate it in a non-inductive resistor whose value is the same as the Z_o of the coaxial line, and whose power rating is sufficient to dissipate 50 watts or so for prolonged periods. The transmitter should then be tuned and loaded to the proper point in the "tune" position. The unit should then be momentarily switched to the operate position to see that the final plate current reading is correct. In the event that non-inductive resistors are not available, it is possible to use a 100 watt lamp and obtain a SWR of about 1.5/1 on a 52 ohm line.

d. METER Switch. - The METER switch selects various circuits to be metered by the meter directly above the switch. This meter has 3 scales: 0-250; 0-500 and 0-1000. The table below indicates how it is used:

METER SWITCH POSITION	CIRCUIT METERED	FULL SCALE DEFLECTION READS
LV	Low voltage	500 volts
HV	High voltage	1000 volts
GRID	PA grid current (DC)	25 ma
MOD IND	Mod. grid current	10 ma
MOD	Mod. plate current	250 ma

The meter on the left reads PA Plate current only. Full scale deflection reads 500 ma.

e. AUDIO GAIN. - This control adjusts the level of modulation in phone operation.

f. LV Switch. - The LV switch turns on the filaments and the low voltage plate and bias supply. (Plate voltage is not applied to the r-f exciter tubes, however, until the HV switch is turned on, except when the CW-CAL-PH switch is on CAL position.)

g. HV Switch. - The HV switch turns on the high voltage supply and connects plate voltage to the r-f exciter tube through operation of carrier control relay K301. The push-to-talk connections are in parallel with this switch.

h. FINAL TUNING. - This control is used to obtain resonance of the PA plate circuit. It must be reset after each adjustment of the ANT. LOADING controls.

i. ANT. LOADING. - This control is used to obtain correct antenna tuning and loading. Start with this control in position number 1. Usually the 80-meter band will load up on position 1, 2, or 3, the 40-meter band on 4, the 20-meter band on 5, the 15-meter band on 6, and the 10 and 11-meter bands on position 6 of the loading control.

j. TUNE-OPERATE SWITCH. - This switch inserts some resistance in the primary of the power transformer in the TUNE position to reduce plate voltage during the tuning procedure. This switch should always be used to protect the power amplifier tube in off resonance conditions.

k. FIDUCIAL. - This control, a small screwdriver adjustment located directly under the CW-CAL-PH knob, is used to move the vernier dial

index during calibration adjustments. Once it has been set, further adjustment will be unnecessary over long periods of time.

1. 600 - 700 v SWITCH. - This switch, located at the rear of the chassis, is used to select either 600 or 700 volts (approx.) for application to the plate.

3.2.3. OPERATION PROCEDURE.

a. Operate the LV switch to the ON position. Allow two minutes for the tubes to heat.

b. Turn the AUDIO GAIN to the counterclockwise stop. (off)

c. Turn the ANT. LOADING control to position 1. (minimum loading)

d. Place the CW-CAL-PH control in the position indicating the desired emission.

e. Rotate the BAND switch to the band containing the desired operation frequency.

f. Rotate the TUNING dial to the desired frequency.

g. Place the Meter selector switch in the GRID position and close the telegraph key. (If PH emission was selected, it will not be necessary to close the key.)

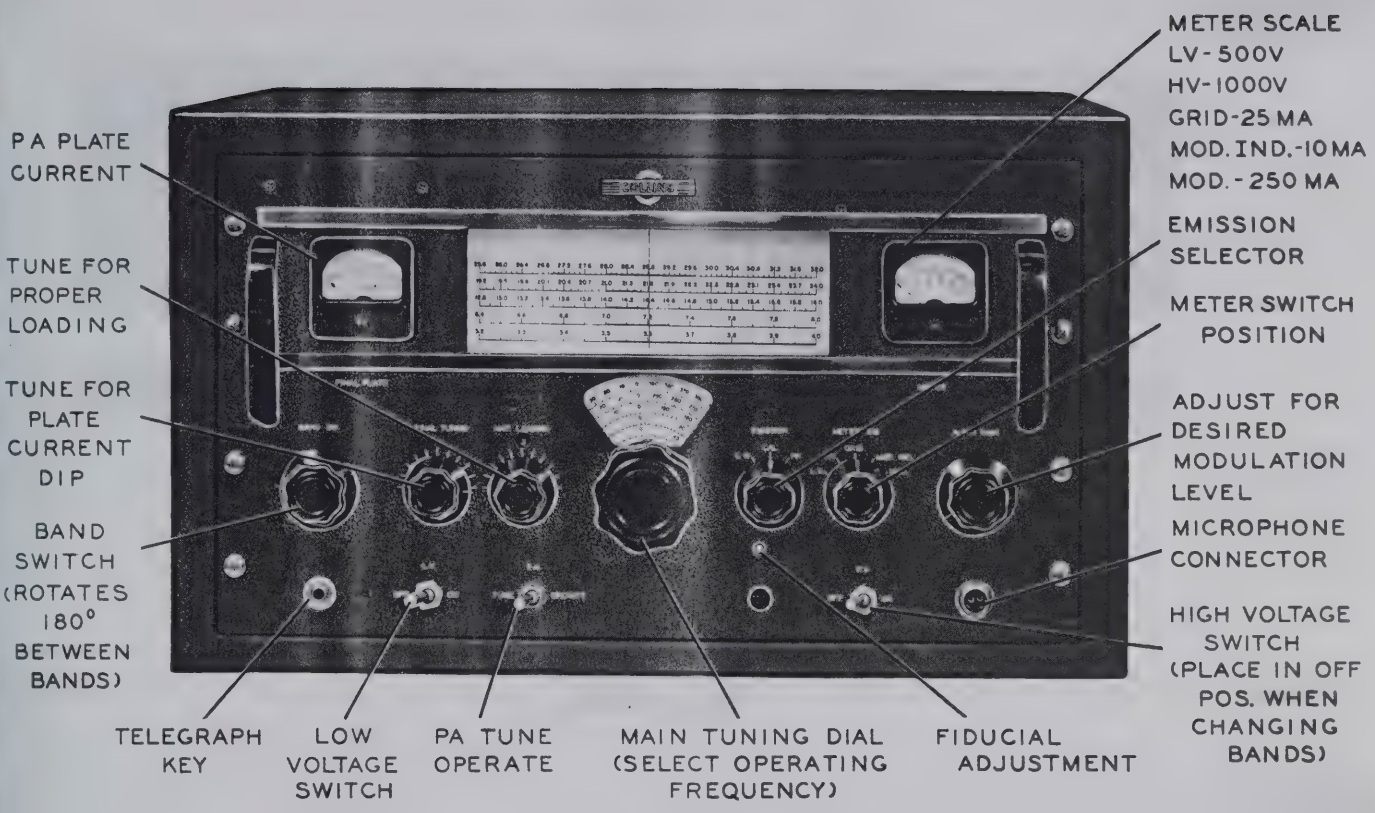
h. Place the TUNE-OPERATE switch in the TUNE position.

i. Observing the FINAL PLATE meter, turn the HV switch ON and quickly turn the FINAL TUNING to resonance, i.e. minimum plate current dip.

j. Observe the GRID current reading on the right hand meter. This should be between 5 and 15 ma.

k. Operate the ANT. LOADING control clockwise until approximately 125 ma loading is obtained while keeping FINAL TUNING at resonance. Repeat this procedure until 125 ma reading is obtained with complete resonance of PA. If it is impossible to load to 125 ma PA plate current, rotate the ANT. LOADING control clockwise until proper loading is obtainable.

l. Place the TUNE-OPERATE switch in the OPERATE position and load the PA to 180 ma with the ANT. LOADING control maintaining resonance with the FINAL TUNING control.



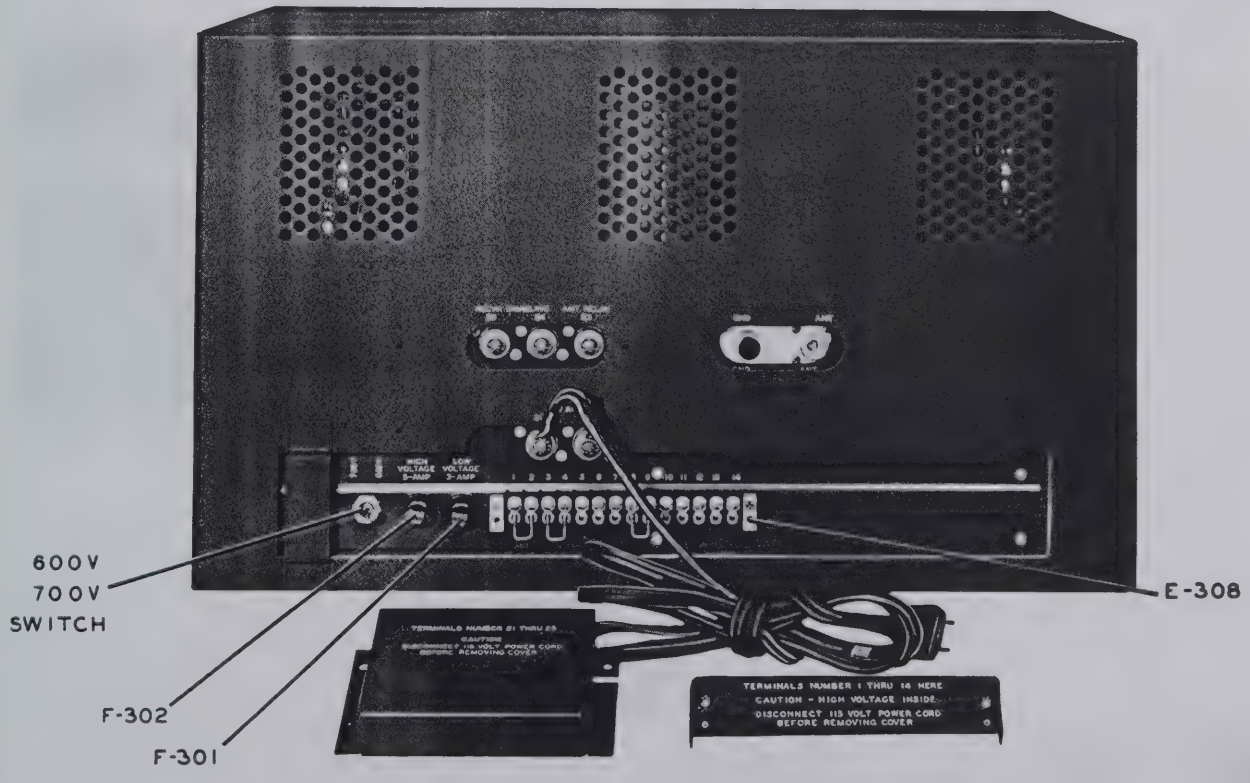
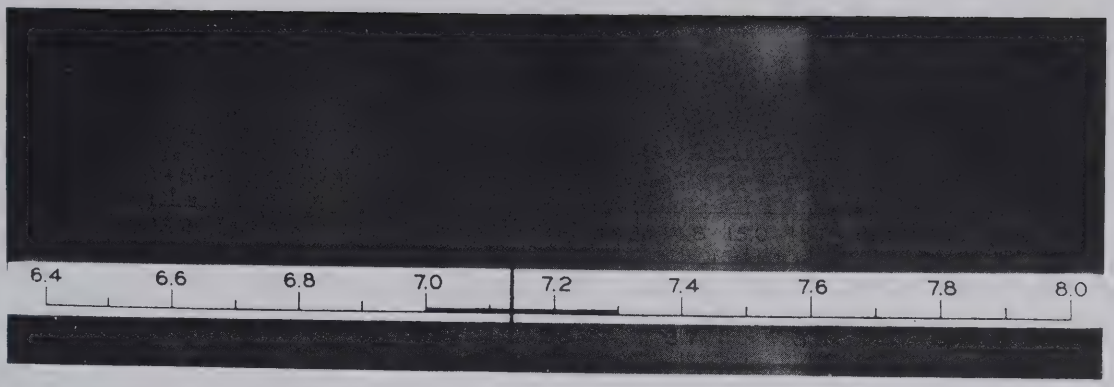
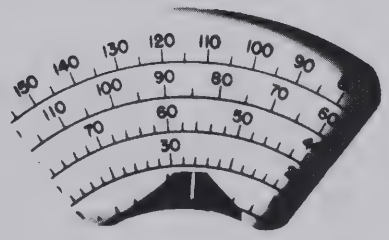
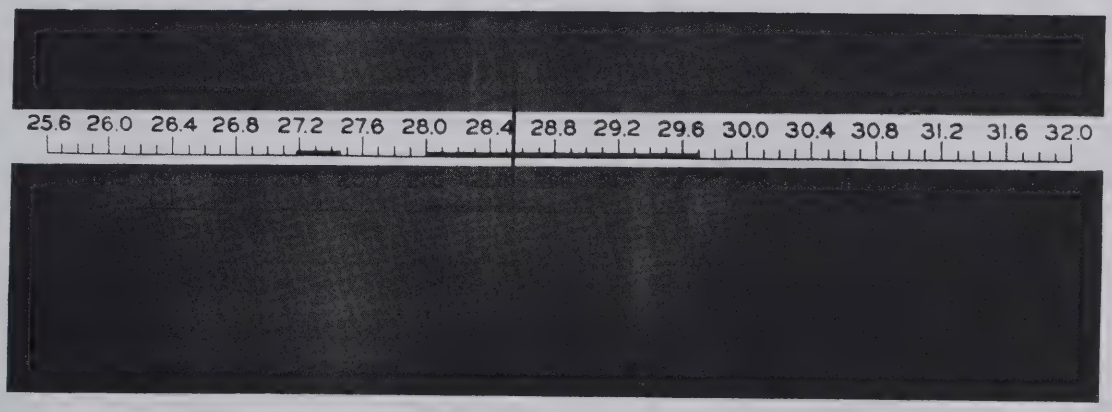


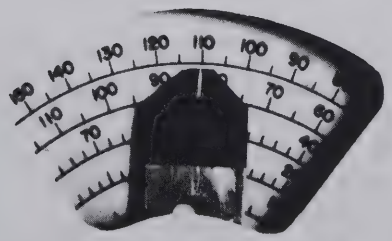
Figure 3-1 32V-3 Control Functions





FREQ.= 7128 KC





FREQ. = 28510 KC

Figure 3-2 Typical Dial Readings

SECTION 4

CIRCUIT DESCRIPTION

4.1. GENERAL. - The following paragraphs have been written to enable the owner of a 32V-3 to understand the functioning of his transmitter more fully. This section should be read and understood before any extensive servicing is attempted.

4.2. CIRCUIT DESCRIPTION. -

4.2.1. RF CIRCUITS.

a. OSCILLATOR. - A type 6SJ7 tube is employed in a highly stabilized master oscillator circuit to generate the controlling radio frequency voltage. This frequency generating unit is a linearly - tuning permeability tuned oscillator with a range of 1.6 to 2 megacycles. Sixteen turns of the main tuning dial cover this range. This provides 50 KC per revolution of the second harmonic (3.2 to 4 mc band). With the end points properly set up, the tuning curve is linear within one dial division of the ideal tuning curve on any of the bands in the operating range. The oscillator circuit is compensated for temperature changes and is entirely enclosed in a heavy aluminum case.

b. INTERMEDIATE STAGES. - Following the master oscillator a type 6AK6 is employed in an untuned, Class A amplifier stage. This stage completely isolates the master oscillator from the remaining tuned stages. The 6AK7 drives a series of three frequency multiplier tubes, the first of which is a type 6AG7. The operating frequencies at the plate of the multiplier tubes for the different bands is given in the following table.

	1ST MULT. 6AG7	2ND MULT. 7C5	3RD MULT. 7C5
80M	3.5 mc	3.5 mc	3.5 mc
40M	3.5 mc	3.5 mc	7 mc
20M	3.5 mc	7 mc	14 mc
15M	5.75 mc	10.5 mc	21 mc
11M	6.8 mc	13.6 mc	27 mc
10M	7 mc	14 mc	28 mc

Plate screen and filament power for these stages is obtained from the low voltage power supply. Gang tuning of the multiplier stages is obtained by moving powdered iron cores, attached to a common platform, in and out of the plate coils which are wound to give linear tuning. This platform to which the iron cores are attached is also ganged to the master oscillator tuning for complete, single control tuning of the exciter stages. Band switching is accomplished by adding extra padding capacity across coils by

means of the band switch in all cases except that of the 14-mc output of the third multiplier where an inductance is switched in parallel with the existing 40 meter inductor to lower the tuning inductance for 14 mc output.

c. POWER AMPLIFIER STAGE. - A type 4D32 tetrode power amplifier tube is used in the PA stage. This tube always operates as a straight amplifier. The plate circuit is tuned by a combination pi-network and "L" network which is band-switched along with the multiplier stages. The combination network reduces the output impedance to around 50 ohms on all bands by means of inductance and capacitance switching. The output network will actually operate satisfactorily with antenna impedances in the range of 26 to 200 ohms. It is also affective in reducing harmonic output of the transmitter. During phone transmission, the screen grid and plate of the 4D32 are both modulated. Plate and screen voltage is obtained from the high voltage supply while filament power is obtained from the low voltage plate supply transformer. The tube is biased with 75 volts of fixed-bias plus some grid lead bias.

4.2.2. AUDIO CIRCUITS. - The first and second audio amplifier consists of a type 6SL7 tube operated as a cascade amplifier. A volume control, R205, is located in the grid circuit of the second amplifier stage. The driver stage employs a type 6SN7 tube with the two triode sections operated in parallel to drive the modulator stage. The modulator stage utilizes a pair of type 807 tubes connected in a push-pull circuit and operating class AB_2. The output of the modulator is coupled to the final amplifier by transformer, T202, to modulate the plate and screen of that stage. During CW operation, the secondary of the modulation transformer is shorted out by S302A. Bias for the modulator tubes is adjustable by R305, is obtained from the low voltage supply and is regulated by the voltage regulator tube, V304, type VR-75. The secondary of the modulation transformer has a 500-ohm tap provided for supplying 60 watts of audio power to an external load.

4.2.3. HIGH VOLTAGE SUPPLY. - The high voltage transformer is energized when the contacts of relay, K301, are closed. The high voltage supply employs two type 5R4GY recitifier tubes connected in parallel in a full wave circuit. The output is filtered by a single section choke input filter. This supply furnishes voltage for the plate and screen of the final amplifier and plate voltage for the modulator tubes. The amount of output voltage from this supply may be either 600 volts or 700 volts, depending on the position of the tap switch, S305, in the primary winding of the high voltage transformer, T302. For the same power input, the efficiency of the final amplifier improves with the higher operating voltage. The tube manufacturer recommends no more than 600 plate volts for phone operation, but this is for CCS rating. A pair of 15-ohm resistors are connected in series with the HV plate transformer primary for "tune-up". These are shorted out when operating.

4.2.4. LOW VOLTAGE SUPPLY. - Transformer, T301 furnishes power for both the voltage plate supply and the filament of all tubes in the transmitter. T-301

is energized by closing the LV switch, S304. Three separate windings on transformer, T301, furnishes filament power to the tubes. The low voltage plate supply employs a type 5Z4 rectifier tube in a full wave circuit with a two section choke input filter. This supply has a total output voltage of approximately 315 volts, 240 volts is supplied to the audio amplifier, oscillator, buffer and multiplier stages. Bias voltage for the modulator and final amplifier stage is furnished by this supply. It also supplies voltage for the operation of relay, K301.

MAINTENANCE

SECTION 5

MAINTENANCE

5.1. INSPECTION.

5.1.1. GENERAL. - This radio equipment has been constructed of materials considered to be the best obtainable for the purpose and has been carefully inspected and adjusted at the factory to reduce maintenance to a minimum. However, a certain amount of checking and servicing will be necessary to maintain efficient and dependable operation. The following section has been written to aid in checking the equipment.

5.1.2. ROUTINE INSPECTION. - Routine inspection schedules should be set up for periodic checks of this equipment. This inspection should include examination of the mechanical system for excessive wear or binding and of the electrical system for electrical defects and deterioration of components.

If the routine inspection of the equipment is carried out faithfully, the chances of improper operation of the equipment are greatly minimized. It is suggested that this inspection be made as frequently as possible, and it should be sufficiently thorough to include all major electrical circuits of the equipment as well as of the mechanical portion.

a. CLEANING. - The greatest enemies of uninterrupted service in equipment of this type are corrosion and dirt. Corrosion, itself, is accelerated by the presence of dust and moisture on the component parts of the assembly. It is impossible to keep moisture out of the equipment in certain localities, but foreign particles and dust can be periodically removed by means of a soft brush and a dry, oil-free jet of air. Remove the

dust as often as a perceptible quantity accumulates in any part of the equipment. It is very important that rotating equipment, such as variable condensers and tap switches, be kept free from dust to prevent undue wear. Likewise, variable condenser plates should be kept free from dirt to avoid flashover.

One of the greatest sources of trouble in equipment located in a salty atmosphere is corrosion. Corrosion resulting from salt spray or salt-laden atmosphere may cause failure of the equipment for no apparent reason. In general, it will be found that contacts such as tap switches, tube prongs, cable plug connectors, and relay contacts are most affected by corrosion. When it is necessary to operate the equipment in localities subject to such corrosive atmosphere, inspection of wiping contacts, cable plugs, relays, etc., should be made more frequently in order to keep the equipment in good condition.

b. VACUUM TUBES. - Make a check of emission characteristics of all tubes. After making the emission check, examine the prongs on all tubes to make sure they are free from corrosion. See that all tubes are replaced correctly and fully in their sockets, and that a good electrical contact exists between the tube prong and the socket. Use caution in removing and replacing grid or plate caps on tubes so equipped. Before a tube is discarded, make certain that the tube is at fault and the trouble is not due a loose or broken connection within the equipment. A complete set of tested tubes of the same type specified should be kept on hand at all times. If faulty operation of the transmitter is observed and tube failure suspected, each tube may be checked by replacing it with a tube known to be in good condition. Defective tubes causing an overload in power circuits may usually be located by inspection. It will be found that excessive heating or sputtering within the vacuum tubes is a good indication of a fault in the tube circuit.

If tubes have been in use for a period of time equal to or exceeding the manufacturer's tube life rating, it is suggested that they be replaced. A marked improvement in the performance of the equipment is usually noticeable after the weak tubes have been replaced.

c. PRECAUTIONS FOR SATISFACTORY TUBE LIFE.

(1) Before removing any tube from the equipment, make certain the primary power is disconnected from the equipment.

(2) Operate all tubes within ±5% of rated filament voltage.

(3) Do not exceed the rated plate current of any tube during normal operation of the equipment.

d. TUBE REPLACEMENT PRECAUTIONS.

(1) All tubes are removed by pulling them straight away from the chassis.

(2) Remove plate cap connectors from tubes with great care to prevent breaking the seal around the plate cap.

(3) Before inserting a tube make certain it is of the correct type for the socket into which it is to be placed.

NOTE

Changing master oscillator tubes (V001) may cause a slight change in master oscillator calibration.

e. TUBE TABLE.

SYMBOL	TYPE	FUNCTION	RATED FIL. VOLTAGE
V001	6SJ7	Master oscillator	6.3
V101	6AK6	Buffer amplifier	6.3
V102	6AG7	Frequency multiplier	6.3
V103	7C5	Frequency multiplier	6.3
V104	~~705~~ 7C5	Frequency multiplier	6.3
V105	4D32	Power Amplifier	6.3
V201	6SL7	Audio Amplifier	6.3
V202	6SN7	Audio driver	6.3
V203	807	Modulator	6.3
V204	807	Modulator	6.3
V301	5Z4	LV Rectifier	5.0
V302	5R4GY	HV Rectifier	5.0
V303	5R4GY	HV Rectifier	5.0
V304	VR75	Bias Regulator	---
V305	0A2	Screen Voltage Limiter	---
V306	0A2	Screen Voltage Limiter	---

f. RELAYS. - All relays should be inspected at regular intervals. Check the contacts for proper alignment, pitting and corrosion. Use a burnishing tool to clean contacts - never use sandpaper or emery cloth.

5.2. TROUBLE SHOOTING.

5.2.1. GENERAL. - The most common cause of improper operation of radio equipment is tube failure. Refer to paragraph 5.1.2., b. in this section for comments concerning vacuum tube replacement. Defective tubes causing an overload in power circuits may usually be located by inspection. High voltage arcs may be caused by bent condenser plates, corrosion or dust. Corrosion resulting from operating the equipment in a salt laden atmosphere may cause failure of the equipment for no apparent reason.

In general, trouble encountered in radio apparatus can be isolated by means of various tests and measurements; then the section of the transmitter in which the trouble is located can be determined. If this is done,

the components in the associated circuit may be checked and the trouble located. Refer to the tables of meter readings and resistance measurements.

No one but an authorized and competent service man equipped with proper test facilities should be permitted to service this equipment.

5.2.2. FUSES.

a. GENERAL. - This equipment is supplied with fuses of the correct rating in each position. Defective fuses should be replaced by spares only after the circuit in question has been carefully examined to make certain that no permanent fault exists. Always replace a fuse with the rating specified by the following table.

FUSE TABLE

SYMBOL	LOCATION	TYPE	RATING
F301	LV Power supply primary	Cartridge (3AG)	3 amp.
F302	HV Power supply primary	Cartridge (3AG)	5 amp.

5.3. ALIGNMENT.

5.3.1. GENERAL. - If the exciter stages get out of alignment for any reason, it is recommended that the unit be realigned at once. Improper operation may result in damage to valuable equipment.

5.3.2. HIGH FREQUENCY OSCILLATOR. - Should trouble develop in the high frequency master oscillator, the unit should be returned to the factory for servicing. However, the unit can be serviced and realigned by persons understanding such techniques providing accurate test equipment is at hand. A crystal controlled frequency standard with outputs at 1700 and 2000 kc with an accuracy of better than .015 percent, must be used for setting the band edges.

a. PROCEDURE.

(1) Apply power to the transmitter and let the MO warm up for about 30 min. then check the oscillator frequency on a receiver. Operate the transmitter with the emission control in the CAL position and the key closed.

(2) Couple a receiver to the output of the oscillator.

(3) Set the vernier index to exact center of the dial window.

(4) Tune receiver to output of 1700 kc freq. standard.

(5) Rotate MO to vicinity of 3400 kc on the exciter dial, and zero beat with the signal from the standard. Jot down dial reading for use as a reference.

(6) Rotate the MO dial toward 4 mc exactly 12 turns.

(7) Tune the receiver to the 2000 kc output of the standard.

(8) The MO should zero beat with the 2000 kc output of the standard at exactly 12 turns of the MO dial.

(9) If such is the case but the dial reading is incorrect, loosen the set screws in the oscillator coupler and turn the dial to the correct reading (4000 kc), after which tighten the set screws again. If the MO does not zero beat with the standard at 4 mc, proceed as follows:

(10) Read the kc difference (the difference between where the signal appeared and where it should have appeared after 12 turns) and multiply it by 5. Add this figure to the actual beat note dial setting if the beat note was less than 12 turns, or subtract it if the beat note occurred at more than 12 turns. Now set the dial to this new frequency, remove the trimmer plug from the top of the oscillator, and turn the adjustment until zero beat is again reached. It will be found that the high and low ends are very nearly 12 turns apart. Repeat the above procedure until such is the case; remember that a new reference point will occur at the low ends of the dial each time.

Examples of above operations:

#1

Beat note at low end of dial	= 3402 kc
Reading at which beat note should appear after 12 turns of dial	= 4002 kc
Actual dial reading	= 4003 kc
Difference frequency (4003 - 4002)	= 1 kc
Multiplied by 5	= 5 kc
Subtracted from 4003 (since beat note occurred at more than 12 turns)	= 3998 kc

After setting dial to 3998 kc and zero beating the MO to the standard with the trimmer adjustment, the low end beat note should appear at 3398 kc.

#2

Beat note on low end of dial	= 3498 kc
Reading at which dial should appear after 12 turns	= 3998 kc
Actual dial reading	= 3996 kc
Difference frequency (3998 - 3996)	= 2 kc
Multiplied by 5	= 10 kc
Added to 3996 (since beat note occurred at less than 12 turns of the dial)	= 4006 kc

After setting the dial at 4006 and zero beating the MO to the standard with the trimmer adjustment the low end beat note should appear at 3406 kc.

(11). After the oscillator has been adjusted to cover the range 3400 to 4000 kc in exactly 12 turns, the coupler set screws can be loosened and the dial set on frequency.

NOTE

The above method of adjustment is used at the factory. This is a short-cut method and proves very reliable. Actually, the object is to get the 1700 kc and the 2000 kc outputs of the oscillator exactly 12 turns apart. The objective can also be attained by using the slower method of moving the trimmer capacitor in one direction or the other; then checking results until the desired answer is obtained. Be sure to replace the trimmer cover plug after alignment.

NOTE

Somewhat greater accuracy can be obtained if the oscillator end points are set by using harmonic operation, i.e. listen in the 14 or 28 mc region for the harmonics of the 1700 and 2000 kc signals and set the corresponding harmonic of the MO to zero beat with these. Do this only after obtaining a very close adjustment as outlined above.

5.3.3. MULTIPLIER STAGES. - Should the grid drive to the final fall below 5 ma on the meter due to change of tubes or aging of components, the transmitter r-f circuits should be realigned. Proceed as outlined below only after the master oscillator has been checked and recalibrated as outlined in paragraph 5.3.2.

A small fiber screwdriver and a 1/4" open end wrench are required for these adjustments.

a. PROCEDURE.

(1) Remove the transmitter from the cabinet and tip it up on end. (RF section up.)

(2) Remove 3 access covers from perforated shield.

(3) Remove the fuse from the HV primary. (This allows the low voltage supply to be turned on while the HV supply remains turned off.)

(4) Turn the LV and HV power switches ON.

(5) Place the CW-CAL-PH switch in the PH position.

(6) Place the METER selector switch in the GRID position.

(7) Adjust for maximum grid current, using the adjustments and conditions listed below in order from top to bottom of the list. (Refer to figure 5-1 for adjustment identification.)

ORDER OF ADJUSTMENT	BAND SW SET AT	TUNING SET AT	ADJUSTMENT
1	10M	28,800	3 Slugs marked "28.8"
2	40M	7,300	C150
3	40M	7,200	1 Slug marked "7.2"
4	15M	21,600	3 Trimmers marked "21.6"
5	20M	14,250	3 Trimmers marked "14.4"
6	80M	3,750 kc	1 Trimmer marked "3.6"

NOTE

In item 4 under ADJUSTMENT, the mistracking of the third multiplier plate circuit will result in low grid current when the main tuning dial is set much outside the limits of the amateur 20-meter band (14 to 14.4 mc). Proper grid current can be obtained at any frequency on the range 12.8 to 16 mc by adjustment of trimmer C137 (marked 14.4 on the third multiplier.

NOTE

If extensive multiplier alignment has been necessary, it is likely that the two spurious signal traps will need tuning. Do not touch the spurious signal tuning condensers unless this is so, since these adjustements are very critical. C149, the spurious signal trap tuning condenser for the 80-meter band, is located on the side of the multiplier unit next to C150, see figure 5-4. These traps are tuned as follows: With the

transmitter aligned as indicated in the above paragraphs, tune the transmitter for 3.5 mc output and listen with a receiver to the 1.75 mc output. Watching the receiver "S" meter, tune C147 for minimum signal. Then tune the transmitter up on 7.15 mc and listen on 3.575 mc with the receiver. Adjust C149 for minimum signal. Both of these adjustments will be very sharp and care should be taken that they are not disturbed in the least after the adjustments have been made. Replace the multiplier bottom cover.

5.3.4. MODULATOR BIAS ADJUSTMENT. - The modulator bias can be adjusted by turning the screwdriver slot equipped potentiometer R305. For best distortion characteristics, the static, or resting, modulator plate current should be 55 ma with the 600/700 v switch in the 700 v position. Potentiometer R305 is located within the top of the cabinet near the filter capacitors; therefore, the interlock switch will have to be held closed while making this adjustment. Take great care to avoid touching any components carring high voltage.

The proper bias for the modulator grids is approximately minus 25 volts.

5.4. LUBRICATION. - The following parts should be lubricated annually or whenever the need arises by brushing a thin film of the indicated lubricant on the points of mechanical contact. Don't over-lubricate.

~~a. PA Bandswitch Contacts: Mobile PD535A (Socony Vacuum Oil Co.)~~

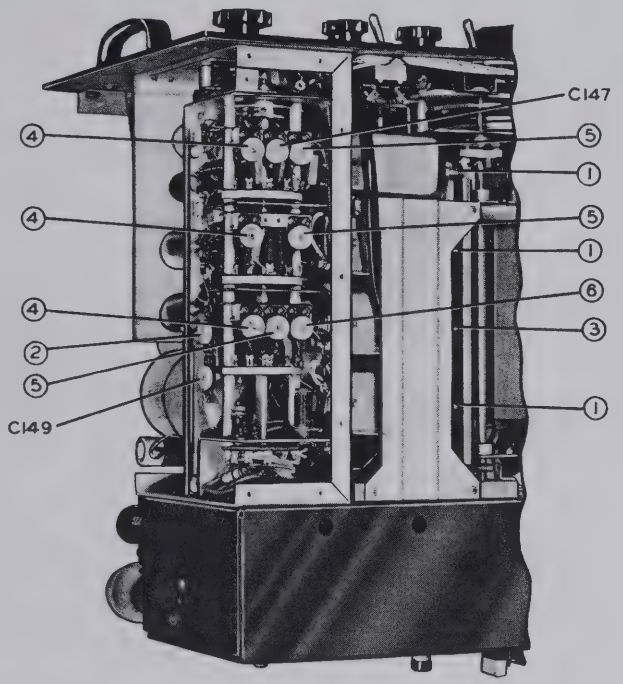
b. Panel Bushings: MOBILE PD535A (Socony Vacuum Oil Co.) or SAE 20

5.5. OSCILLATOR TUBE REMOVAL. - Replacing an oscillator tube requires the breaking of the seal around the shield and it will then become necessary to reseal the shield. If it becomes necessary to replace an oscillator tube, use a glyptal cement or a generous application of Duco cement to reseal the shield.

5.6. DESICCANT CAPSULE. - A silica-gel tube is mounted on top of the oscillator shield. The silica-gel absorbs moisture from within the oscillator and aids in retaining the oscillator calibration. Moisture causes the color of the silica-gel to change from blue to pink. The silica-gel tube is screwed into a hole in the shield. The plastic tube should be replaced by a new tube of silic-gel when all material within the tube has changed from blue to pink. New tubes of silica-gel may be ordered from the Collins Radio Company.

NOTE

The seal around the oscillator tube shield and the silica-gel tube is more easily broken if the parts are warm. This can be done safely with a light bulb or infra-red lamp placed close to the oscillator.



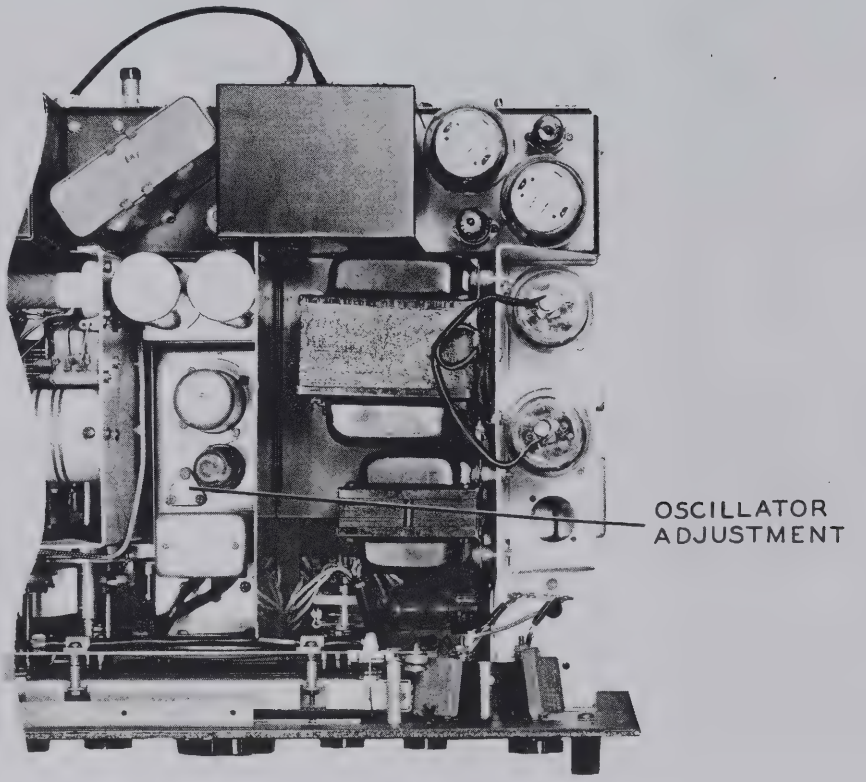


Figure 5-1 Alignment Adjustments

TYPICAL TEST VOLTAGES

DC Voltages to Ground measured with Volt-ohmyst. Conditions: Phone - No Mod. Readings taken at LF end of each band.

TUBE	Pin	R.F.					
		3.5	7.0	14.0	21.0	27.2	28.0
V101	6AK6						
G1	1	-17.0	-16.5	-1.0	-0.9	-1.0	-0.9
K	2,7	1.0	1.0	2.9	2.85	2.85	2.9
P	5	235	230	230	225	225	225
G2	6	155	150	65	65	65	65
V102	6AG7						
K	1,3,5	2.6	2.6	3.9	3.2	3.4	3.2
G1	4	-18.	-18.	-36	-36	-38	-36
G2	6	215	215	205	205	205	210
P	8	230	230	220	220	225	225
V103	7C5						
P	2	235	235	215	210	215	215
G2	3						
G1	6	-24.	-23.	-56.	-21.	-69.	-51.
K	7	25.	25.	27.	27.	26.	26.
V104	7C5						
P	2	225	220	215	215	215	215
G2	3						
G1	6	-115	-110	-170	-175	-150	-150
K	7	-59	-56	-52	-52	-51	-50
V105	RK-4D32						
G2	2	285	300	300	300	295	295
K	4,5	0	0	0	0	0	0
G1	6	-120	-100	-93	-105	-105	-102
P	Cap	690	680	690	690	690	690

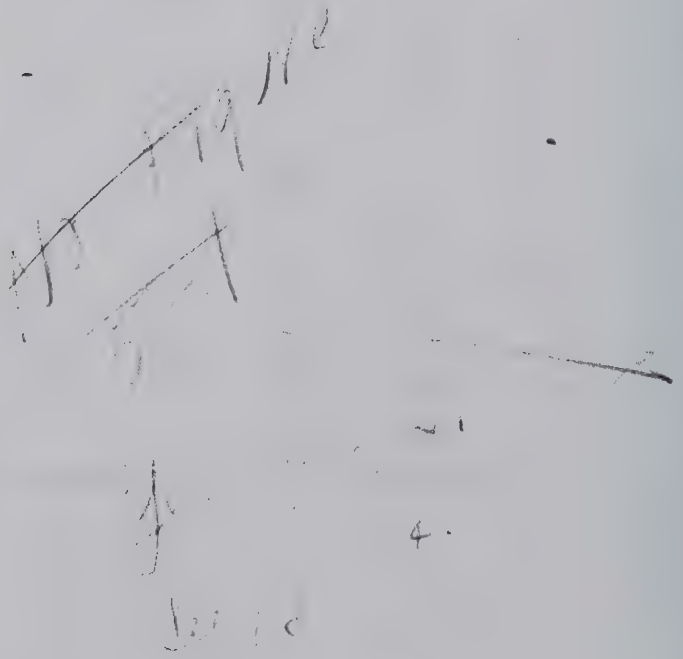
DC Voltages to Ground in Audio System (Volt-ohmyst)

4D32 Plate Current = 220 MA Ep = 700 V Key Down

	Audio Amplifier V201, 6SL7GT			Driver V202, 6SN7GT			Modulator V203, & 4, 807		
		PH	CW		PH	CW		PH	CW
Pin 1	G	-0.6	-0.8	G	0	0			
2	P	88	-0.9	P	235	235	G2	235	0
3	K	0	0	K	7.4	7.4	G1	-25	-25
4	G	0	0	G	0	0	K	0	0
5	P	100	100	P	235	235	--	---	---
6	K	0.8	0.8	K	7.4	7.4	P	720	740
7									
8									

Key up - key down conditions of V105 (4D32)
CW operation
f = 7 mc

	Key Up	Key Down
Plate E	820	740
Plate I	0	220
Screen E	300	300



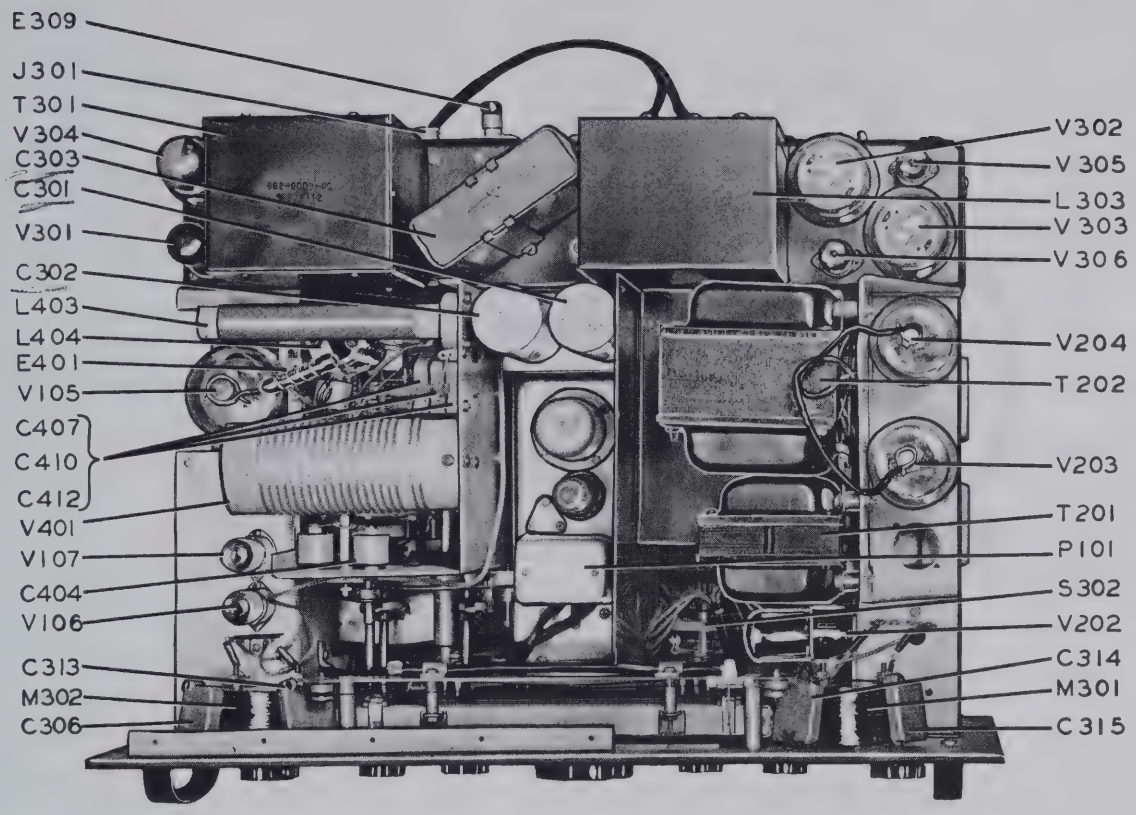


Figure 5-2 32V-3 Parts Arrangement - Top View

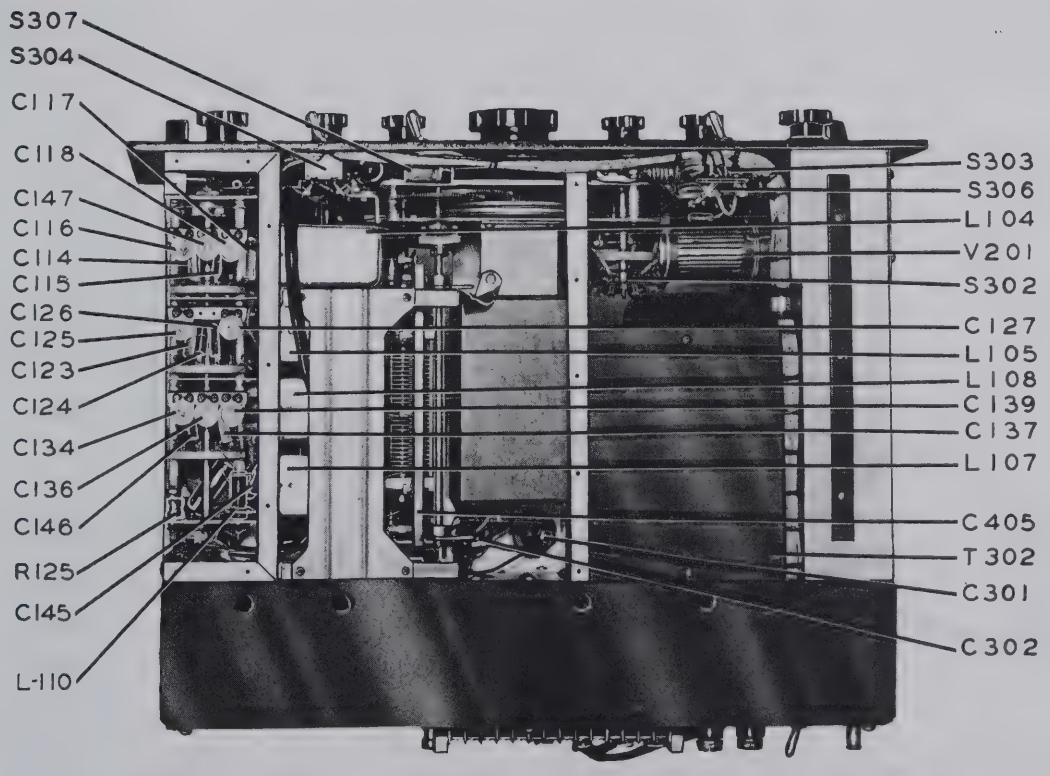


Figure 5-3 32V-3 Parts Arrangement - Bottom View

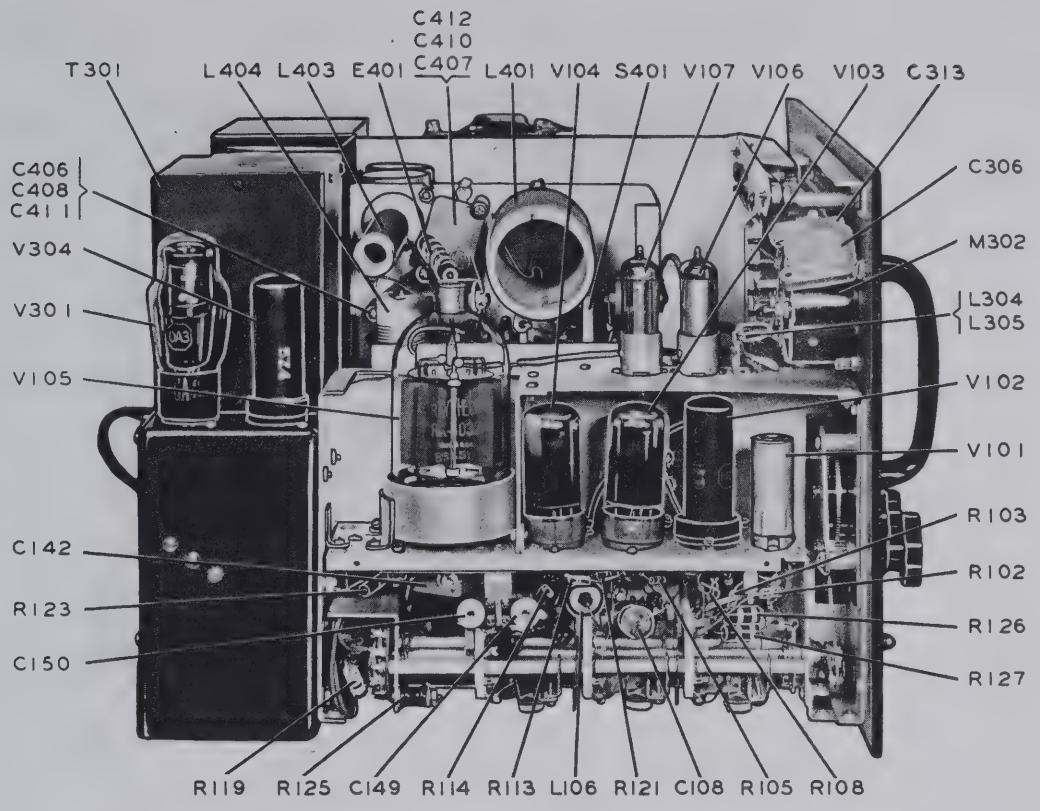


Figure 5-4 32V-3 Parts Arrangement - Left Side Open

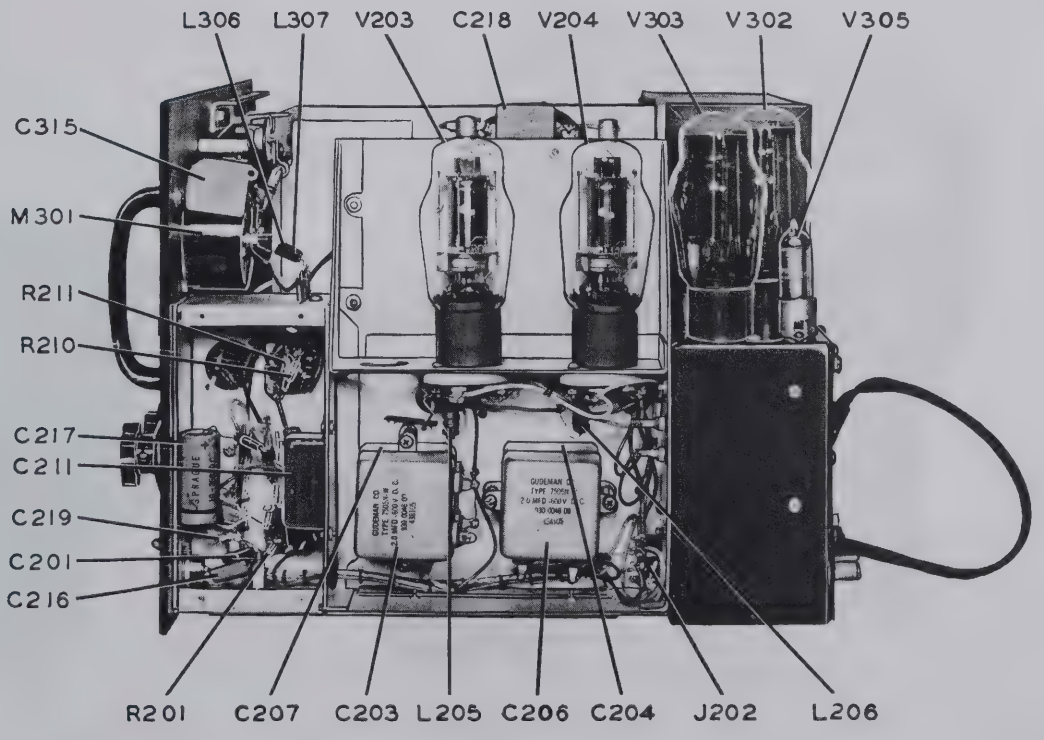


Figure 5-5 32V-3 Parts Arrangement - Right Side Open

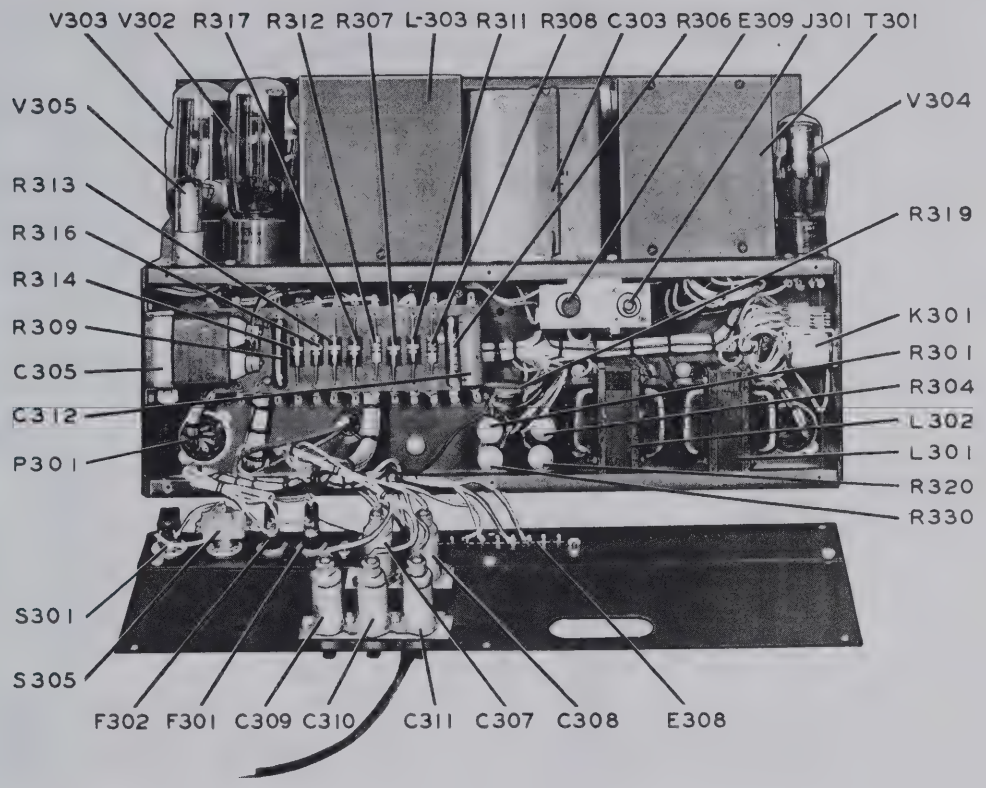


Figure 5-6 32V-3 Parts Arrangement - Rear Open

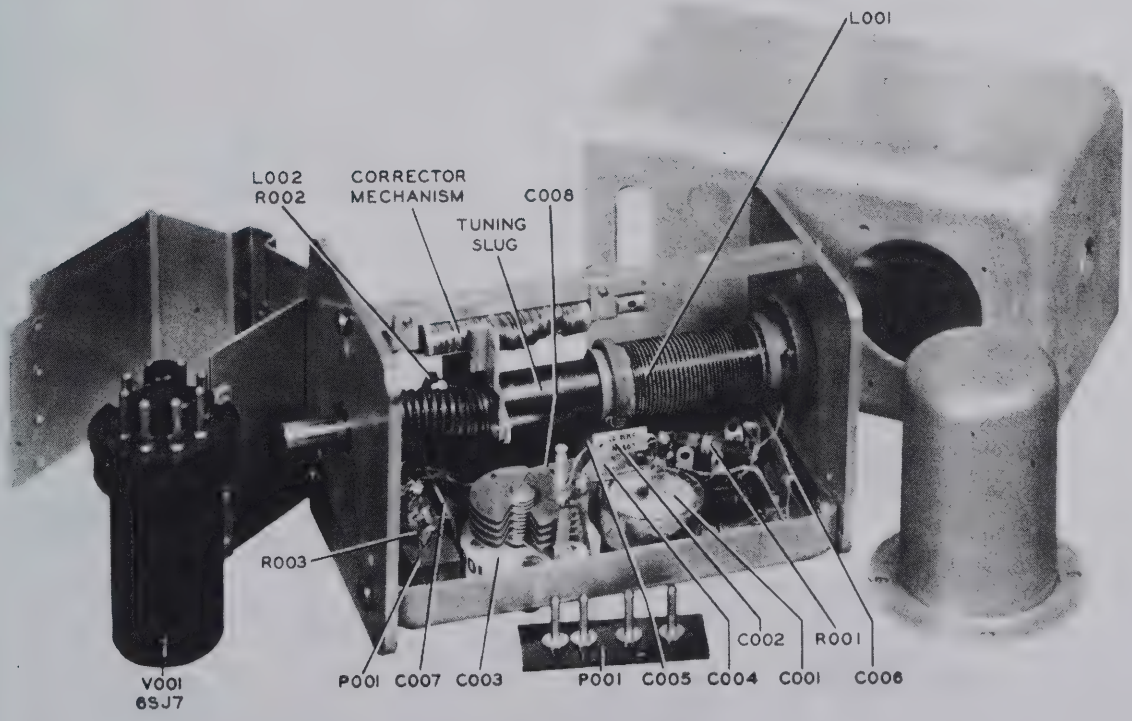


Figure 5-7 Parts Arrangement 70E-8A - Open

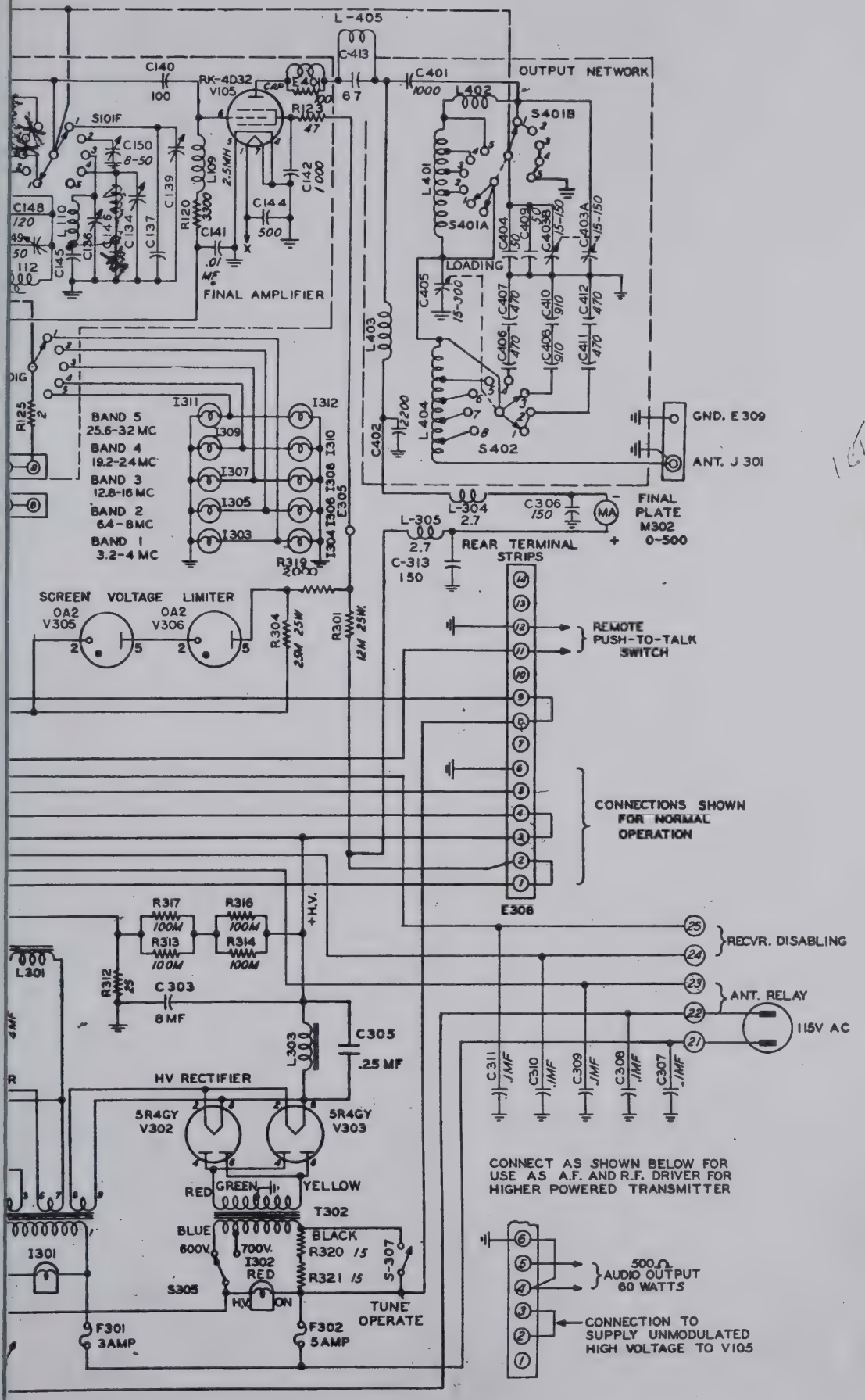


Figure 5-8 Model 32V-3 Complete Schematic Diagram

SECTION 6

PARTS LIST

32V-3 TRANSMITTER

ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
C101	Buffer Amp Coupling	CAPACITOR: Ceramic; 30 mmf p/m 2%; 500 WV	913 0118 00
C102	Osc. Plate Filter	CAPACITOR: ~~Ceramic~~; 10,000 mmf p/m 20%; ~~350~~ WV	935 2118 00 ~~913 0106 00~~
C103	Buffer Grid Voltage Divider	CAPACITOR: Ceramic; 30 mmf p/m 2%; 500 WV	913 0118 00
C104	Buffer Cathode By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C105	Buffer Screen By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C106	Buffer Plate By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C107	1st Mult. Coupling	CAPACITOR: Ceramic; 100 mmf p/m 10%; 500 WV	916 4003 00
C108	1st Mult. Grid By-pass	CAPACITOR: Paper; 100,000 mmf p/m 10%; 400 WV	931 3020 00
C109	1st Mult. Cathode By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C110	1st Mult. Screen By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C111	Key Click Filter	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C112	2nd Mult Coupling	CAPACITOR: Ceramic; 100 mmf p/m 10%; 500 WV	916 4003 00
C113	1st Mult Plate By-pass	CAPACITOR: Mica; 650 mmf p/m 2%; 500 WV	935 5061 00
C114	1st Mult. Plate Tuning	CAPACITOR: Mica; 22 mmf p/m 5%; 500 WV	935 0077 00
C115	1st Mult Plate Tuning	CAPACITOR: Mica; 22 mmf p/m 10%; 500 WV	935 0078 00
C116	1st Mult Tuning	CAPACITOR: Ceramic 8-50 mmf; 350 WV	917 1038 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
C117	1st Mult Plate Tuning	CAPACITOR: Mica; 180 mmf p/m 5%; 500 WV	935 0116 00
C118	1st Mult Plate Tuning	CAPACITOR: Ceramic 8-50 mmf; 350 WV	917 1038 00
C119	2nd Mult Screen By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C120	2nd Mult Screen By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C121	2nd Mult. Plate By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C122	3rd Mult Coupling	CAPACITOR: Ceramic; 100 mf p/m 10%; 500 WV	916 4003 00
C123	2nd Mult Plate Tuning	CAPACITOR: Mica; 20 mmf p/m 5%; 500 WV	935 0076 00
C124	2nd Mult Plate Tuning	CAPACITOR: Mica; 22 mmf p/m 10%; 500 WV	935 0078 00
C125	2nd Mult Plate Tuning	CAPACITOR: Ceramic; 8-50 mmf; 350 WV	917 1038 00
C126	2nd Mult Plate Tuning	CAPACITOR: Mica; 150 mmf p/m 2%; 500 WV	935 0184 00
C127	2nd Mult Plate Tuning	CAPACITOR: Ceramic; 8-50 mmf; 350 WV	917 1038 00
C128	3rd Mult Cathode By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C129	3rd Mult Screen By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C130	3rd Mult Screen By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C131	3rd Mult Plate By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C132	3rd Mult Plate By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
C133	2nd Mult Cathode By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00

ITEM
C134
C135
C136
C137
C138
C139
C140
C141
C142
C143
C144
C145
C146
C147
C148
C149
C150
C151

S MBER	ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
00	C134	3rd Mult Plate Tuning	CAPACITOR: Ceramic; 8-50 mmf; 350 WV	917 1038 00
00	C135		CAPACITOR: Not Used	
00	C136	3rd Mult Plate Tuning	CAPACITOR: Ceramic; 8-50 mmf; 350 WV	917 1038 00
00	C137	3rd Mult Plate Tuning	CAPACITOR: Mica; 120 mmf p/m 5%; 500 WV	935 0109 00
00	C138		CAPACITOR: Not Used	
	C139	3rd Mult Plate Tuning	CAPACITOR: Ceramic; 8-50 mmf; 350 WV	917 1038 00
00	C140	PA Coupling	CAPACITOR: Ceramic; 100 mmf p/m 10%; 500 WV	916 4003 00
00	C141	PA Grid By-pass	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
00	C142	PA Screen By-pass	CAPACITOR: Mica; 1000 mmf p/m 20%; 2500 WV	936 0250 00
00	C143		CAPACITOR: Not Used	
00	C144	PA Filament By-pass	CAPACITOR: Mica; 500 mmf p/m 20%; 500 WV	912 0302 00
00	C145	3rd Mult Plate Blocking	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00
	C146	3rd Mult Plate Tuning	CAPACITOR: Mica; 20 mmf p/m 5%; 500 WV	935 0076 00
00	C147	160 Meter Tap Tuning	CAPACITOR: Ceramic; 8-50 mmf; 350 WV	917 1038 00
00	C148	80 Meter Tap fixed Tuning	CAPACITOR: Mica; 120 mmf p/m 5%; 500 WV	935 0109 00
00	C149	80 Meter Tap Var. Tuning	CAPACITOR: Ceramic; 8-50 mmf; 350 WV	917 1038 00
00	C150	L-108 Trimmer	CAPACITOR: Ceramic; 8-50 mmf; 350 WV	917 1038 00
	C151	Key Filter	CAPACITOR: Ceramic; 100 mmf p/m 10%; 500 WV	916 4003 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER	ITEM
C201	Audio Input RF filter	CAPACITOR: Mica; 47 mmf p/m 20%; 500 WV	935 0093 00	C302
C202	Audio Coupling	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00	C303
C203	V201 Plate By-pass	CAPACITOR: Paper; 2 mf p/m 10%; 600 WV	930 0046 00	
C204	V201 Plate By-pass	CAPACITOR: Paper; 2 mf p/m 10%; 600 WV	930 0046 00	C304
C205	Driver Grid Coupling	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00	C305
C206	Driver Cathode By-pass	CAPACITOR: Paper; 2 mf p/m 10%; 600 WV	930 0046 00	C306
C207	Mod Cathode By-pass	CAPACITOR: Paper; 2 mmf p/m 10%; 600 WV	930 0046 00	C307
C208		CAPACITOR: Not Used		C308
C209		CAPACITOR: Ceramic; 100 mmf p/m 10%; 500 WV	916 4003 00	C309
C210		CAPACITOR: Not Used		C310
C211	Audio Plate Decoupling	CAPACITOR: Paper; .5 mf p/m 20%; 600 WV	956 2086 40	C311
C212		CAPACITOR: Not Used		C312
C213		CAPACITOR: Not Used		C313
C214		CAPACITOR: Not Used		C314
C215		CAPACITOR: Not Used		C315
C216	Microphone Coupling	CAPACITOR: Mica; 10,000 mmf p/m 10%; 300 WV	935 2117 00	C401
C217	LV Rect Filter	CAPACITOR: Electrolytic; 10 mf plus 50% minus 10%; 350 WV	183 1048 00	
C218		CAPACITOR: Not Used		
C301	LV Rect Filter	CAPACITOR: Paper; 4 mf plus 40 minus 15%; 600 WV	961 3005 00	

NS MBER	ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
3 00	C302	LV Rect Filter	CAPACITOR: Paper; 4 mf plus 40 minus 15%; 600 WV	961 3005 00
7 00	C303	HV Rect Filter	CAPACITOR: Paper; 8 mf p/m 20%; 1000 WV	930 0150 00
6 00	C304		CAPACITOR: Not Used	
6 00	C305	HV Filter Tuning	CAPACITOR: Paper; .25 mf p/m 10%; 2000 WV	930 7220 00
7 00	C306	Plate Meter By-pass	CAPACITOR: Mica; 150 mmf p/m 20%; 2500 WV	936 0195 00
6 00	C307	Noise Suppressor	CAPACITOR: Paper; 0.1 mf plus 20% minus 10%; 600 WV	241 0006 00
3 00	C308	Noise Suppressor	CAPACITOR: Paper; 0.1 mf plus 20% minus 10%; 600 WV	241 0006 00
	C309	Noise Suppressor	CAPACITOR: Paper; 0.1 mf plus 20% minus 10%; 600 WV	241 0006 00
6 40	C310	Noise Suppressor	CAPACITOR: Paper; 0.1 mf plus 20% minus 10%; 600 WV	241 0006 00
	C311	Noise Suppressor	CAPACITOR: Paper; 0.1 mf plus 20% minus 10% 600 WV	241 0006 00
	C312	Bias Filter	CAPACITOR: Electrolytic; 20 mf 150 WV minus 10% plus 100%	183 1042 00
7 00	C313	Plate Meter By-pass	CAPACITOR: Mica; 150 mmf p/m 20%; 2500 WV	936 0195 00
8 00	C314	Meter By-pass	CAPACITOR: Mica; 150 mmf p/m 20% 2500 WV	936 0195 00
	C315	Meter By-pass	CAPACITOR: Mica; 150 mmf p/m 20%; 2500 WV	936 0195 00
5 00	C401	PA Plate Blocking	CAPACITOR: Mica; 1000 mmf p/m 20%; 2500 WV	936 0250 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER	ITEM
C402	PA Plate By-pass	CAPACITOR: Mica; 2200 mmf p/m 20%; 2500 WV	936 1083 00	E306
C403	Final Tuning	CAPACITOR: Variable Air Dielectric; Dual Sect; 10-150 mmf per sect	920 0011 00	E307
C403A	Part of C403	CAPACITOR: Section of C403		E308
C403B	Part of C403	CAPACITOR: Section of C403		
C404	Final Tuning	CAPACITOR: Ceramic; 50 mmf p/m 10%; WV; 2500 v rms at 2 mc 1000 v rms at 16 mc	913 4503 20	E309
C405	Antenna Loading	CAPACITOR: Variable air-dielectric single sect; 15-300 mmf	920 0014 00	E401
C406	Antenna Loading	CAPACITOR: Mica; 470 mmf p/m 10%; 2500 WV	936 0226 00	F301
C407	Antenna Loading	CAPACITOR: Mica; 470 mmf p/m 5%; 2500 WV	936 0226 00	F302
C408	Antenna Loading	CAPACITOR: Mica; 910 mmf p/m 10%; 2500 WV	936 0246 00	I301
C409	Final Tuning	CAPACITOR: Ceramic; 50 mmf p/m 10%; WV; 2500 v rms at 2 mc 1000 v rms at 16 mc	913 4503 20	I302
C410	Antenna Loading	CAPACITOR: Mica; 910 mmf p/m 10%; 2500 WV	936 0246 00	I303
C411	Antenna Loading	CAPACITOR: Mica; 470 mmf p/m 10%; 2500 WV	936 0226 00	I304
C412	Antenna Loading	CAPACITOR: Mica; 470 mmf p/m 10%; 2500 WV	936 0226 00	
C413	Trap Tuning	CAPACITOR: Ceramic; 67 mmf p/m 5%; 5000 WV; p/o E-401	913 0090 00	I305
E304	Wire Tie Point	TERMINAL: Ceramic bushing 13/32" diam x 5/16" thk w/ solder lug 17/32" lg	190 1103 00	I306
E305	Wire Tie Point	TERMINAL: Ceramic bushing 13/32" diam x 5/16" thk w/ solder lug 17/32" lg	190 1103 00	I307
				I308

ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
E306	Wire Tie Point	TERMINAL: Ceramic bushing 13/32" diam x 5/16" thk w/ solder lug 17/32" lg	190 1103 00
E307	Wire Tie Point	TERMINAL: Ceramic bushing 13/32" diam x 5/16" thk w/ solder lug 17/32" lg	190 1103 00
E308	Rear Terminal Strip	CONNECTOR: 14 term, barrier type strip w/ lugs on back	367 0022 00
E309	Ground Connector	POST, BINDING: Push type; 1/8" wire hole	372 1400 00
E401	Parasitic Suppressor	PA TRAP ASSEM: 1-1/3 turns tinned #14 wire, 100 ohm 10w resistor, 67 mmf capacitor (incl C413, L405)	505 4443 002
F301	LV and Filament	FUSE: 3 amp; 250 v	264 4080 00
F302	High Voltage	FUSE: 5 amp; 250 v	264 4090 00
I301	Pilot Lamp	BULB: Pilot light; 110 v, 55 ma; 6 w; candelabra base; T4-1/2 bulb	262 3330 00
I302	Pilot Lamp	BULB: Pilot light; 110 v, 55 ma; 6 W; candelabra base; T4-1/2 bulb	262 3330 00
	For I302	JEWEL: Pilot light red faceted	262 2110 00
I303	Dial Lamp	BULB: Pilot light; 6 v, .2 amp; midget fl base; T1-3/4 bulb	262 0023 00
I304	Dial Lamp	BULB: Pilot light; 6 v, .2 amp; midget fl base; T1-3/4 bulb	262 0023 00
I305	Dial Lamp	BULB: Pilot light; 6 v, .2 amp midget fl base; T1-3/4 bulb	262 0023 00
I306	Dial Lamp	BULB: Pilot light; 6 v, .2 amp midget fl base; T1-3/4 bulb	262 0023 00
I307	Dial Lamp	BULB: Pilot light; 6 v, .2 amp; midget flange base; T1-3/4 bulb	262 0023 00
I308	Dial Lamp	BULB: Pilot light; 6 v, .2 amp; midget flange base; T1-3/4 bulb	262 0023 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	PART NUMBER	EM
I309	Dial Lamp	BULB: Pilot light; 6 v, .2 amp; midget fl base; T1-3/4 bulb	262 0023 00	09
I310	Dial Lamp	BULB: Pilot light; 6 v, .2 amp; midget fl base; T1-3/4 bulb	262 0023 00	10
I311	Dial Lamp	BULB: Pilot light; 6 v, .2 amp; midget fl base, T1-3/4 bulb	262 0023 00	11
I312	Dial Lamp	BULB: Pilot light; 6 v, .2 amp; midget fl base; T1-3/4 bulb	262 0023 00	12
J101	Key	JACK: Phone single circuit, midget	360 0008 00	13
J102	Cable	CONNECTOR: Std octal socket	220 1850 00	201
J201	Microphone	CONNECTOR: 2 female cont; wall mtg	369 1004 00	202
J202	Modulator	CONNECTOR: Std octal socket	220 1850 00	203
J301	Antenna Connector	CONNECTOR: Single round female cont	357 9003 00	204
K301	Carrier Control	RELAY: Circuit control; cont 1A1B1A and 2A; 48 v coil	970 1014 00	205
L101	Osc plate choke	COIL: RF choke; 4 pi; duo-log wnd; 2.5 mh p/m 20%; .125 amp	240 2100 00	206
L102		COIL: Not Used		207
L103	Buffer Plate Choke	COIL: RF choke; 500 uh p/m 10%; 4 pi; universal wnd	240 0042 00	301
L104	1st Mult Tuning	COIL: LF; 38T #28 wire	503 2896 00	302
L105	2nd Mult Tuning	COIL: MF; 17.3T #28 wire	503 2895 00	303
L106	2nd Mult Plate Choke	COIL: RF choke; 2 pi; duo-lat wnd; 208 uh	240 6000 00	304
L107	3rd Mult Tuning	COIL: HF 7.6 T #28 wire	503 2835 00	305
L108	3rd Mult Tuning	COIL: LF; 38T #28 wire	503 2896 00	

MBER	ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
3 00	L109	PA Grid Choke	COIL: RF choke; 4 pi; duo-lat wnd; 2.5 mh p/m 20%; .125 amp	240 2100 00
3 00	L110	3rd Mult Tuning	COIL: 23T #26 Wire	503 4512 001
3 00	L111	1st Mult Plate Choke	COIL: RF choke; 3 pi; universal wnd; 1 mh plus 20 minus 10%	240 0047 00
3 00	L112	3rd Mult Plate Choke	COIL: RF choke; 3 pi; universal wnd; 1 mh plus 20 minus 10%	240 0047 00
8 00	L113	Key Filter	COIL, RF choke; 2.7 mh, 300 ma; 45 turns #30 AWG wire	240 0012 00
0 00	L201		Coil: Not used	
4 00	L202		COIL: Not used	
0 00	L203		COIL: Not used	
3 00	L204		COIL: Not used	
4 00	L205	Modulator Plate Choke	COIL: RF choke; 500 uh p/m 10%; 4 pi, universal wnd	240 0042 00
0 00	L206	Modulator Plate Choke	COIL: RF choke; 500 uh p/m 10%; 4 pi, universal wnd	240 0042 00
2 00	L207	PTT Line Filter	COIL: RF choke; 2.7 mh, 300 ma, 45 turns #30 AWG wire	240 0012 00
6 002	L301	LV Filter	REACTOR, FILTER: 11 hy p/m 15%	668 0012 00
5 002	L302	LV Filter	REACTOR, FILTER: 11 hy p/m 15%	668 0012 00
0 00	L303	HV Filter	REACTOR, FILTER: 5 hy p/m 15%	668 0055 00
5 001	L304	PA Meter Filter Choke	COIL: RF choke; 2.7 mh, 300 ma, 45 turns #30 AWG wire	240 0012 00
6 002	L305	PA Meter Filter Choke	COIL: RF choke; 2.7 mh, 300 ma, 45 turns #30 AWG wire	240 0012 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMB	ITEM
L306	Meter Filter Choke	COIL: RF choke; 2.7 mh, 300 ma, 45 turns #30 AWG wire	240 0012 0	R111
				R112
L307	Meter Filter Choke	COIL: RF choke; 2.7 mh, 300 ma, 45 turns #30 AWG wire	240 0012 0	
				R113
L401	PA Plate Tuning	COIL: LF tank; 20T #14 wire	503 2892 0	R114
L402	PA Plate Tuning (28 mc)	COIL: HF tank; 5T silver pl copper tubing	503 2831 0	R115
L403	PA Plate Choke	COIL: RF choke; 169 turns of #27 chrome oxide wire	504 3667 0	
				R116
L404	Network Coil	COIL: output; 32 turns; #18 wire	503 6486 0	
L405	Trap Tuning	COIL: PA Trap Assem (E401)	505 4452 0	R117
M301	Mult Purpose	METER: 0-5 ma DC; 50 scale divisions; marked 0250, 0500, 0100	458 0110 0	
				R118
M302	PA Plate	METER: 0500 ma DC; 50 scale divisions	450 1500 0	R119
P101	Osc. Power	CONNECTOR: 4 prong plug; part of oscillator filter assem	503 2868 0	R120
P201	Microphone	CONNECTOR: 2 prong plug	369 1005 0	R121
P301	Modulator power	CONNECTOR: Std 8 term octal plug	369 1009 0	
P302	RF circuits power	CONNECTOR: Std 8 term octal plug	369 1009 0	R122
P303		CONNECTOR: Not Used		R123
P304	Antenna Plug	CONNECTOR: Single round male contact	357 9040 0	R124
R101		RESISTOR: Not Used		R125
R102	Buffer Grid	RESISTOR: 22,000 ohm p/m 10%; 1/2 w	745 1142 0	R126
R103	Buffer Cathode	RESISTOR: 560 ohm p/m 10%; 1/2 w	745 1076 0	
R104	Buffer Screen	RESISTOR: .33 meg p/m 10%; 1/2 w	745 1191 0	R127
R105	V101, V102, V103 grid	RESISTOR: .10 meg p/m 10%; 1/2 w	745 1170 0	R201
R106	1st Mult Grid	RESISTOR: .10 meg p/m 10%; 1/2 w	745 1170 0	R202
R107	1st Mult Cathode	RESISTOR: 820 ohm p/m 10%; 1/2 w	745 1083 0	R203
R108	1st Mult Screen	RESISTOR: 22,000 ohm p/m 10%; 1/2 w	745 1142 0	R204
R109	1st Mult Plate Decoupling	RESISTOR: 1000 ohm p/m 10%, 1 w	745 3086 0	R205
				R206
R110	2nd Mult Grid	RESISTOR: .10 meg p/m 10%; 1/2 w	745 1170 0	R207

ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
R111	2nd Mult Screen	RESISTOR: 10,000 ohm p/m 10%; 1/2 w	745 1128 00
R112	2nd Mult Plate Decoupling	RESISTOR: 1000 ohm p/m 10%; 1 w	745 3086 00
R113	3rd Mult Grid	RESISTOR: .10 meg p/m 10%; 1/2 w	745 1170 00
R114	3rd Mult Screen	RESISTOR: 10,000 ohm p/m 10%; 1/2 w	745 1128 00
R115	3rd Mult Plate Decoupling	RESISTOR: 470 ohm p/m 10%; 1 w	745 3072 00
R116	3rd Mult Plate Decoupling	RESISTOR: 470 ohm p/m 10%; 1 w	745 3072 00
R117	3rd Mult Grid Stabilizer	RESISTOR: 10 ohm p/m 10%; 1/2 w	745 1002 00
R118	2nd Mult Cathode	RESISTOR: 1500 ohm p/m 10%; 1/2 w	745 1093 00
R119	PA Grid Meter Shunt	RESISTOR: 6.2 ohm p/m 5%; 1/2 w	707 0104 00
R120	PA Grid	RESISTOR: 3300 ohm p/m 10%; 1 w	745 3107 00
R121	3rd Mult Grid Voltage Divider	RESISTOR: .22 meg p/m 10%; 1/2 w	745 1184 00
R122	3rd Mult Grid Return	RESISTOR: 680 ohm p/m 10%; 2 w	745 5079 00
R123	PA Screen Stabilizer	RESISTOR: 47 ohm p/m 10%; 1 w	745 3030 00
R124		Not Used	
R125	Dial Light Dropping	RESISTOR: 2 ohm p/m 10%; 2 w	710 1070 00
R126	Voltage Regulator Dropping	RESISTOR: 5600 ohm p/m 10%; 2 w	745 5118 00
R127	Voltage Regulator Dropping	RESISTOR: 5600 ohm p/m 10%; 2 w	745 5118 00
R201	Audio Input RF Filter	RESISTOR: 4700 ohm p/m 10%; 1/2 w	745 1114 00
R202	V201 Grid	RESISTOR: 1.0 meg p/m 10%; 1/2 w	745 1212 00
R203		RESISTOR: Not Used	
R204	V201 Cathode	RESISTOR: 4700 ohm p/m 10%; 1/2 w	745 1114 00
R205	Audio Gain Control	RESISTOR: .5 meg p/m 20%; 1/2 w	376 3027 00
R206	V201 Plate	RESISTOR: .47 megohm p/m 10%; 1/2 w	745 1198 00
R207	V201 Plate	RESISTOR: .47 megohm p/m 10%; 1/2 w	745 1198 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
R208	V201 Plate Decoupling	RESISTOR: 47,000 ohm p/m 10%, 1/2 w	745 1156 00
R209	V201 Plate Decoupling	RESISTOR: 47,000 ohm p/m 10%, 1/2 w	745 1156 00
R210	V202 Grid	RESISTOR: .47 megohm p/m 10%; 1/2 w	745 1198 00
R211	V202 Cathode	RESISTOR: 560 ohm p/m 10%; 1/2 w	745 1076 00
R212	thru R215	RESISTOR: Not Used	
R216	Audio Decoupling	RESISTOR: 2200 ohm p/m 10%; 1 w	745 3100 00
R301	V105 Screen Dropping	RESISTOR: 12,000 ohm p/m 5%; 25 w	710 0366 00
R302		RESISTOR: Not Used	
R303		RESISTOR: Not Used	
R304	V105 Screen Bleeder	RESISTOR: 25,000 ohm p/m 10%; 25 w size	710 3254 20
R305	Mod Bias Control	RESISTOR: Variable; WW; 1000 ohm p/m 10%; 4 w	377 0007 00
R306	Bias Bleeder	RESISTOR: 750 ohm p/m 5%; 10 w	710 1750 10
R307	LV Bleeder	RESISTOR: 0.10 megohm p/m 5%; 2 w	745 5169 00
R308	LV Meter Shunt	RESISTOR: 25 ohm p/m 5%; 1/2 w	701 0001 00
R309	Relay Voltage Divider	RESISTOR: 5000 ohm p/m 10%; 10 w	710 1542 00
R310	Relay Voltage Divider	RESISTOR: 7500 ohm p/m 10%; 10 w	710 0033 00
R311	LV Bleeder	RESISTOR: 0.10 megohm p/m 5%; 2 w	745 5169 00
R312	HV Meter Shunt	RESISTOR: 25 ohm p/m 5%; 1/2 w	701 0001 00
R313	HV Bleeder	RESISTOR: 0.10 megohm p/m 5%; 2 w	745 5169 00
R314	HV Bleeder	RESISTOR: 0.10 megohm p/m 5%; 2 w	745 5169 00
R315	Mod. Shunt Motor	RESISTOR: WW; 51 ohm p/m 5%; 1/2 w	707 0026 00
R316	HV Bleeder	RESISTOR: 0.10 megohm p/m 5%; 2 w	745 5169 00
R317	HV Bleeder	RESISTOR: 0.10 megohm p/m 5%; 2 w	745 5169 00

NS UMBER	ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
00	R318	Mod. Ind Shunt	RESISTOR: 25 ohm p/m 5%; 1/2 w	701 0001 00
00	R319	Voltage Regulator Dropping	RESISTOR: 2000 ohm p/m 10%; 10 w	710 1242 00
00	R320	Series Tuning	RESISTOR: WW; 15 ohm p/m 10%; .25 w	710 3152 00
00	R321	Series Tuning	RESISTOR: WW; 15 ohm p/m 10%; .25 w	710 3152 00
00	S101	Band Change Switch	SWITCH: 8 pole, 5 position, 4 sect; non-shorting	503 2923 004
	S101A		SWITCH: Part of S101	
20	S101B		SWITCH: Part of S101	
00	S101C		SWITCH: Part of S101	
	S101D		SWITCH: Part of S101	
10	S101E		SWITCH: Part of S101	
00	S101F		SWITCH: Part of S101	
00	S101G		SWITCH: Part of S101	
00	S101H		SWITCH: Part of S101	
00	S301	Cabinet Interlock	SWITCH: SP normally open	260 0526 00
00	S302	Emission Selector	SWITCH: Band change; 8 pole; 3 position 3 sect; non-shorting	259 0044 00
00	S302A		SWITCH: Part of S302	
	S302B		SWITCH: Part of S302	
00	S302C		SWITCH: Part of S302	
00	S302D		SWITCH: Part of S302	
00	S302E		SWITCH: Part of S-302	
	S302F		SWITCH: Not Used	
360	2361			

ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER	ITEM
S302G		SWITCH: Not Used		T302
S302H		SWITCH: Not Used		
S303	High Voltage Switch	SWITCH: SPST toggle; 25 amp	266 1040 00	T303
S304	Low Voltage Switch	SWITCH: SPST toggle; 25 amp	266 1040 00	V101
S305	600-700 v selector	SWITCH: DPDT toggle; 1 amp 250 v, 3 amp 125 v	260 0551 00	V102
S306	Meter Selector	SWITCH: Band change; 2 pole, 5 position, 1 sect; non-shorting	259 0045 00	V103
				V104
S306A		SWITCH: Part of S306		V105
S306B		SWITCH: Part of S306		V106
S307		SWITCH: SPST toggle; 3 amp 250 v	260 0857 00	
S401	PA Plate Circuit	SWITCH: Band change; 2 pole, 5 position, 1 sect; shorting	259 0043 00	V107
S401A		SWITCH: Part of S401		V201
S401B		SWITCH: Part of S401		V202
S402	Antenna Loading	SWITCH: Band change; 6 position, shorting type	269 1248 00	V203
T201	Modulator input	TRANSFORMER: Driver; pri; 12,000 ohm, secd; 5300 ohm CT, freq response 300-3500 cps p/m 3 db	667 0011 00	V204
				V301
T202	Modulation	TRANSFORMER: Mod; pri; 7000 ohm CT, 100 ma DC max, bal; secd; 500/3750 ohm, 200 ma DC, unbalanced; freq response 300/3500 cps p/m 3 db; 60 w	667 0010 00	V302
				V303
T301	Low Voltage	TRANSFORMER: pri; 115 v, secd #1; 850 v CT, secd #2; 5 v, 4 amp, secd #3; 5 v, 4 amp, secd #4; 6.3 v, 9 amp 50/60 cps	662 0009 00	V304
				V305
				V306

INS UMBER	ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
	T302	High Voltage	TRANSFORMER: Power; 50/60 cps; pri; 115 v, secd; 1100 v CT, w/ pri leads #1 and #2 on 115 v, secd leads #4 and #6 should be 1370 v rms	662 0014 00
0 00	T303			
0 00	V101	Buffer Amp.	TUBE: Type 6AK6; power amp pentode; miniature	254 0632 00
1 00	V102	1st Multiplier	TUBE: Type 6AG7; video power amp pentode	254 0120 00
5 00	V103	2nd Multiplier	TUBE: Type 7C5; beam power amp; octalox	254 0217 00
	V104	3rd Multiplier	TUBE: Type 7C5; beam power amp; octalox	254 0217 00
	V105	Power Amplifier	TUBE: Type RK 4D32; tetrode	256 0078 00
	V106	Oscillator Voltage Regulator	TUBE: 0A2 voltage regulator	257 0052 00
7 00				
3 00	V107	Oscillator Voltage Regulator	TUBE: 0B2 voltage regulator	257 0058 00
	V201	1st and 2nd Audio	TUBE: Type 6SL7GT; twin triode amp	254 0187 00
	V202	Audio Driver	TUBE: Type 6SN7GT; twin triode amp	254 0188 00
8 00	V203	Modulator	TUBE: Type 807, transmitting beam power amp	254 0391 00
11 00	V204	Modulator	TUBE: Type 807, transmitting bearm power amp	254 0391 00
	V301	Low Voltage Rectifier	TUBE: Type 5Z4; full wave hi-vac rect	254 0110 00
10 00	V302	High Voltage Rectifier	TUBE: Type 5R4GY; full-wave hi-vac rect	254 0099 00
	V303	High Voltage Rectifier	TUBE: Type 5R4GY; full-wave hi-vac rect	254 0099 00
09 00	V304	Bias Voltage Regulator	TUBE: Type 0A3/VR-75; voltage regulator	257 0008 00
	V305	Screen Voltage Limiter	TUBE: Type 0A2; voltage limiter	257 0052 00
	V306	Screen Voltage Limiter	TUBE: Type 0A2; voltage limiter	257 0052 00

ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER	ITEM
XF301	Holder for F301	HOLDER, FUSE: Extractor post for 1/4" x 1-1/4" fuses	265 1002 00	XV304
XF302	Holder for F302	HOLDER, FUSES: Extractor post for 1/4" x 1-1/4" fuses	265 1002 00	XV305
				XV-306
XI301	Mtg for I301	MTG, PILOT LIGHT: Bracket for candelabra base bulb	262 1320 00	
XI302	Mtg for I302	MTG, PILOT LIGHT: Bracket for candelabra base bulb	262 1320 00	
XV101	Socket for V101	SOCKET, TUBE: Miniature shielded	220 1003 00	
XV102	Socket for V102	SOCKET, TUBE: Octal, bakelite	220 1850 00	
XV103	Socket for V103	SOCKET, TUBE: Loctal, bakelite	220 1002 00	
XV104	Socket for V104	SOCKET, TUBE: Loctal, bakelite	220 1002 00	
XV105	Socket for V105	SOCKET, TUBE: 7 prong ceramic w/ clips	220 1072 00	
XV106	Socket for V106	SOCKET, TUBE: Miniature shielded	220 1003 00	
XV107	Socket for V107	SOCKET, TUBE: Miniature shielded	220 1003 00	
XV201	Socket for V201	SOCKET, TUBE: Octal, bakelite	220 1850 00	
XV202	Socket for V202	SOCKET, TUBE: Octal, bakelite	220 1850 00	
XV203	Socket for V203	SOCKET, TUBE: 5 prong ceramic w/ clips	220 5520 00	
XV204	Socket for V204	SOCKET, TUBE: 5 prong ceramic w/ clips	220 5520 00	
XV301	Socket for V301	SOCKET, TUBE: Octal, bakelite	220 1850 00	
XV302	Socket for V302	SOCKET, TUBE: Octal ceramic w/ clips and key way	220 5810 00	
XV303	Socket for V303	SOCKET, TUBE: Octal ceramic w/ clips and key way	220 5810 00	

NS MBER	ITEM	CIRCUIT FUNCTION	DESCRIPTION	COLLINS PART NUMBER
2 00	XV304	Socket for V304	SOCKET, TUBE: Octal, bakelite	220 1850 00
2 00	XV305	Socket for V305	SOCKET, TUBE: Miniature, 7 term	220 1003 00
	XV-306	Socket for V306	SOCKET, TUBE: Miniature, 7 term	220 1003 00
20 00				
20 00				
03 00				
50 00				
02 00				
00				
72 00				
03 00				
03 00				
50 00				
50 00				
20 00				
20 00				
50 00				
10 00				
10 00				

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